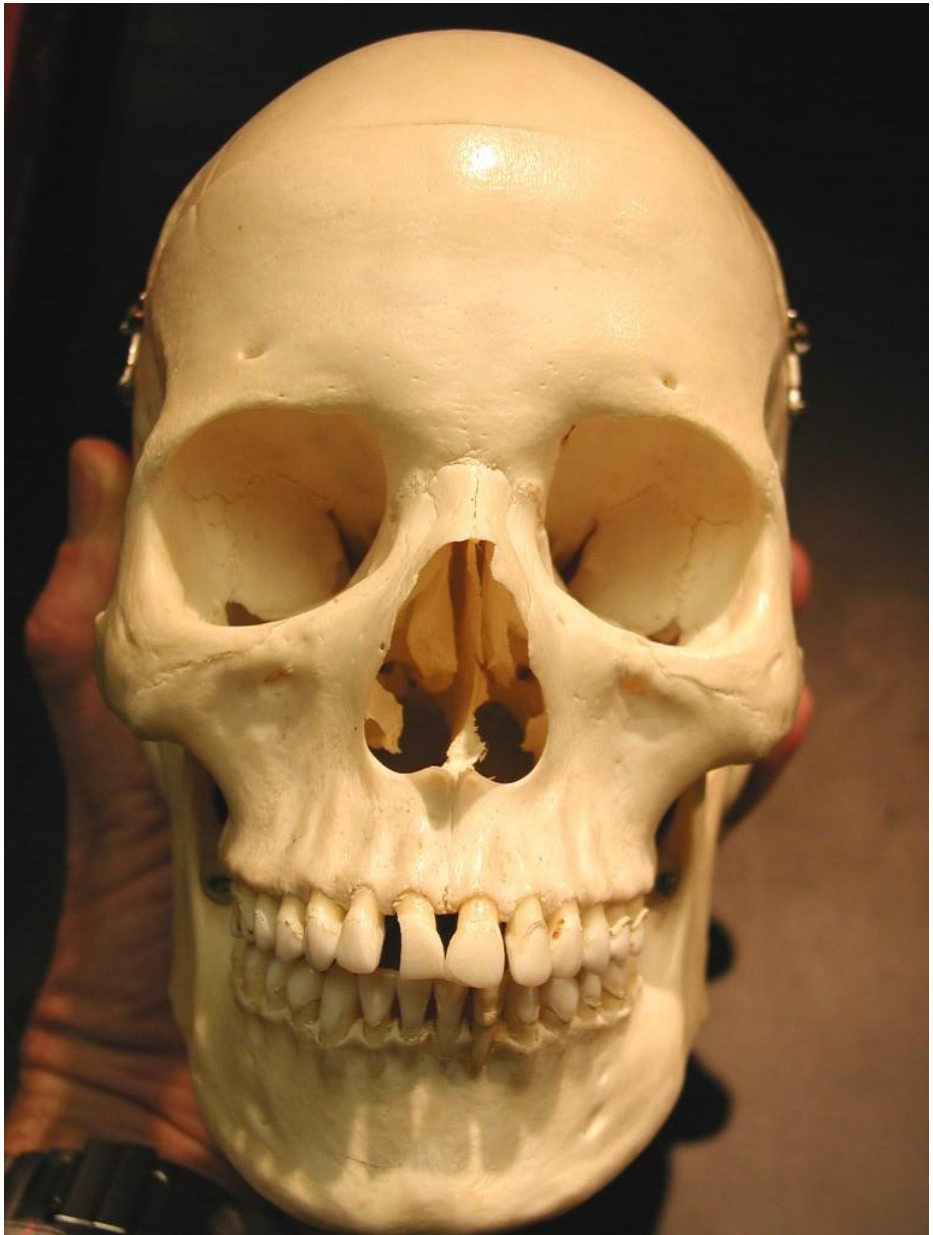
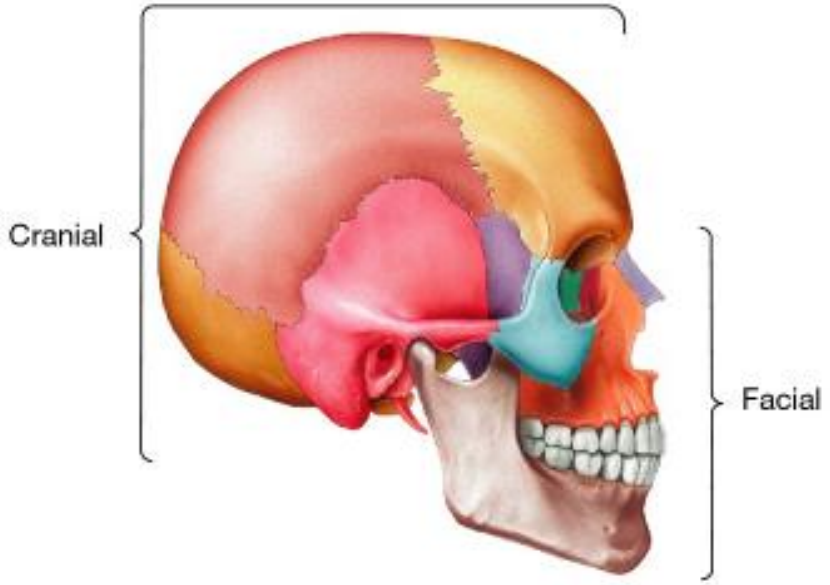
Skull



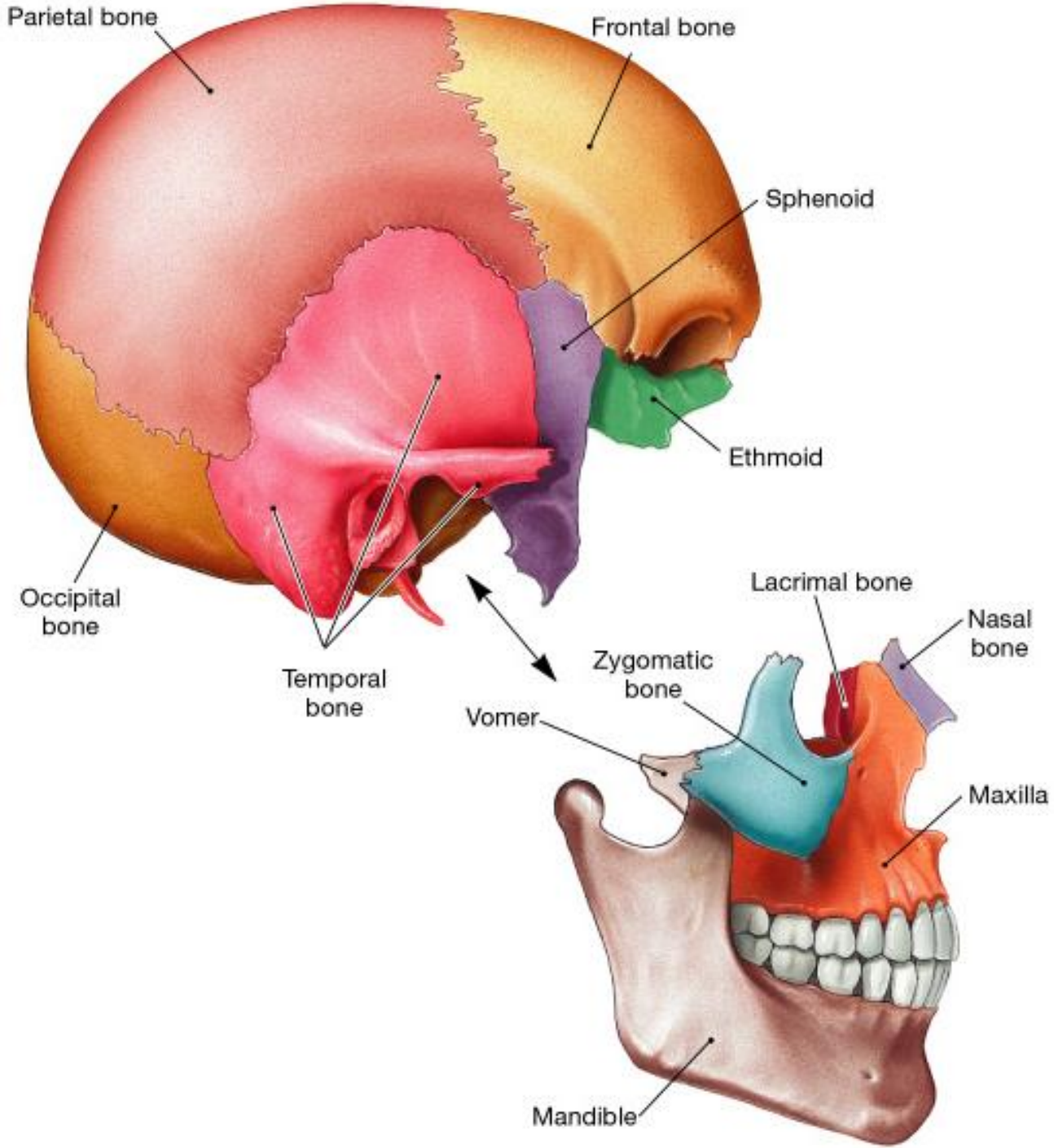


SKULL

ASSOCIATED BONES	7
Auditory ossicles enclosed in temporal bones (*detailed in Chapter 18*)	6
Hyoid bone	1

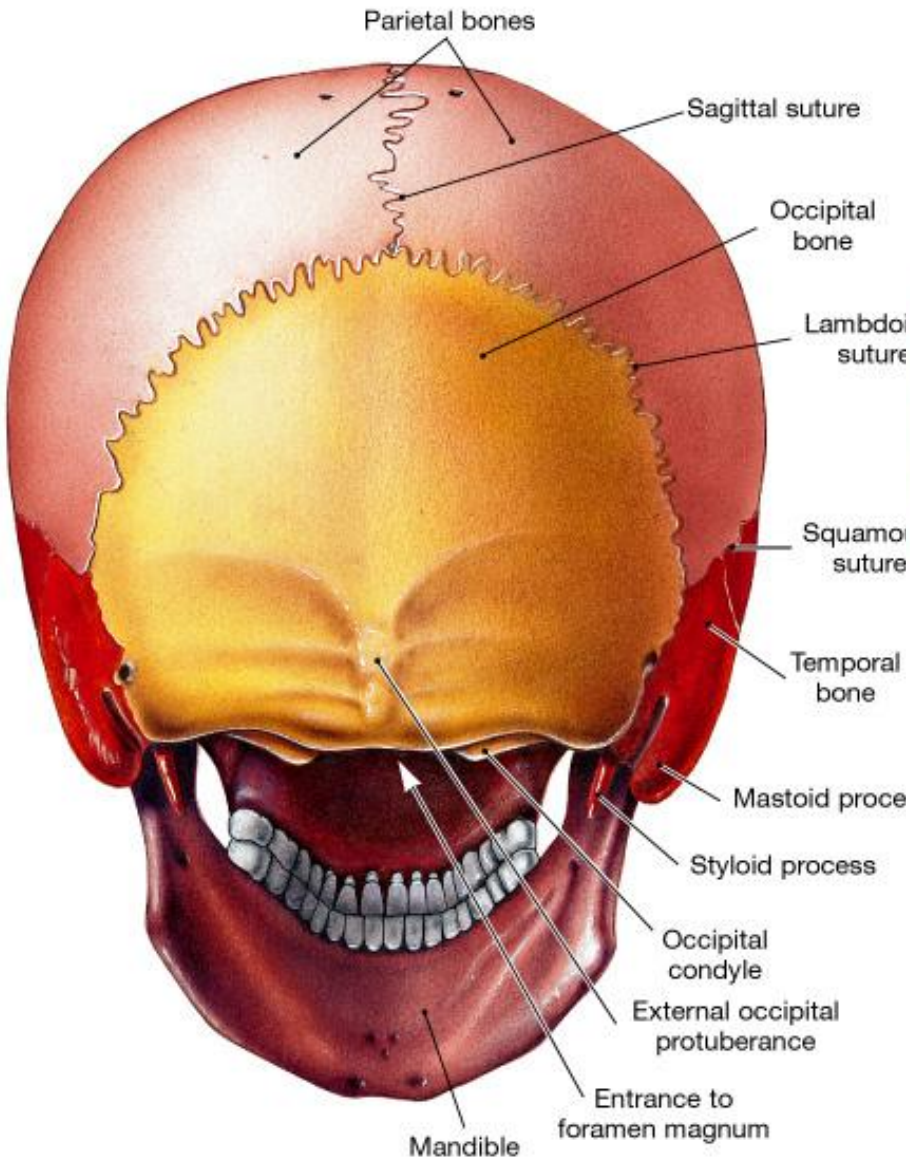
CRANIUM	8
Occipital bone	1
Parietal bones	2
Frontal bone	1
Temporal bones	2
Sphenoid	1
Ethmoid	1

FACE	14
Maxillae	2
Palatine bones	2
Nasal bones	2
Inferior nasal conchae	2
Zygomatic bones	2
Lacrimal bones	2
Vomer	1
Mandible	1

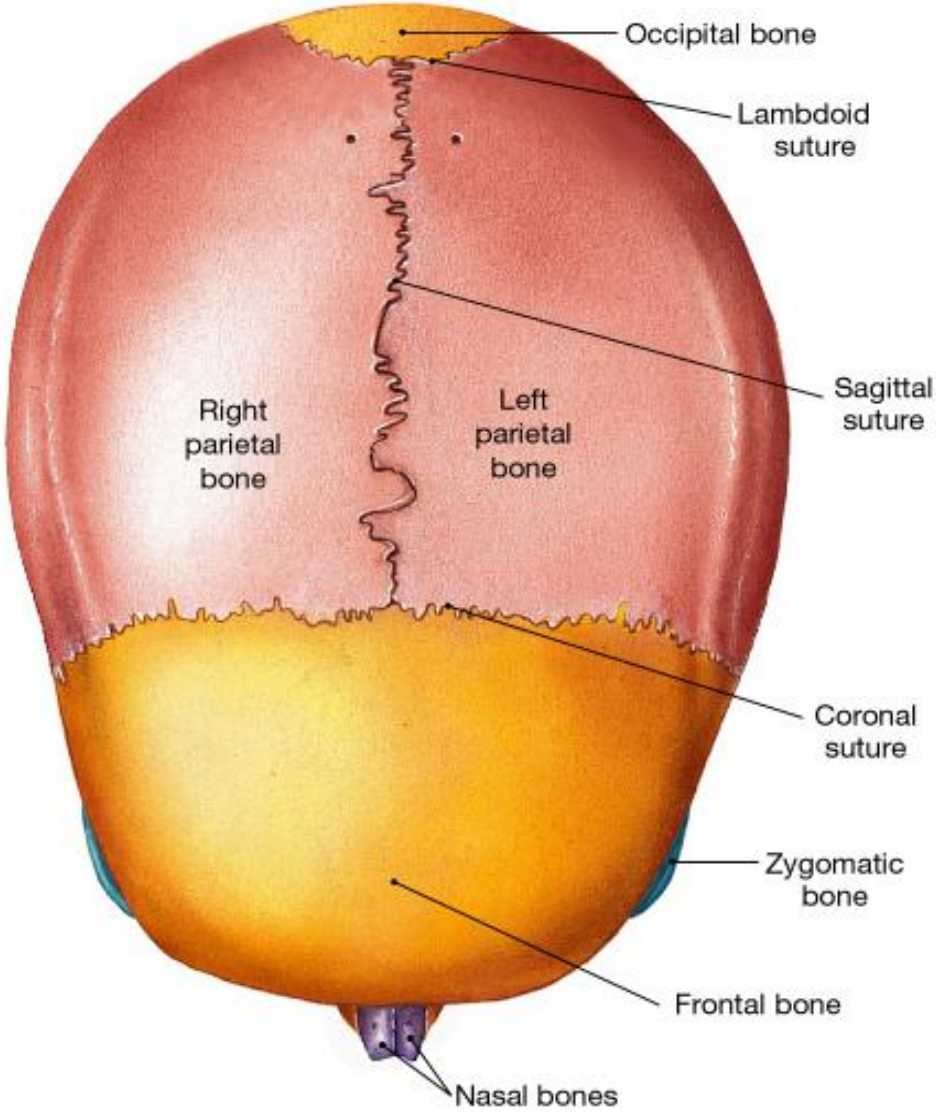

Parietal bone
Frontal bone
Sphenoid
Ethmoid
Occipital bone
Temporal bone
Lacrimal bone
Nasal bone
Zygomatic bone
Vomer
Maxilla
Mandible

Sutures

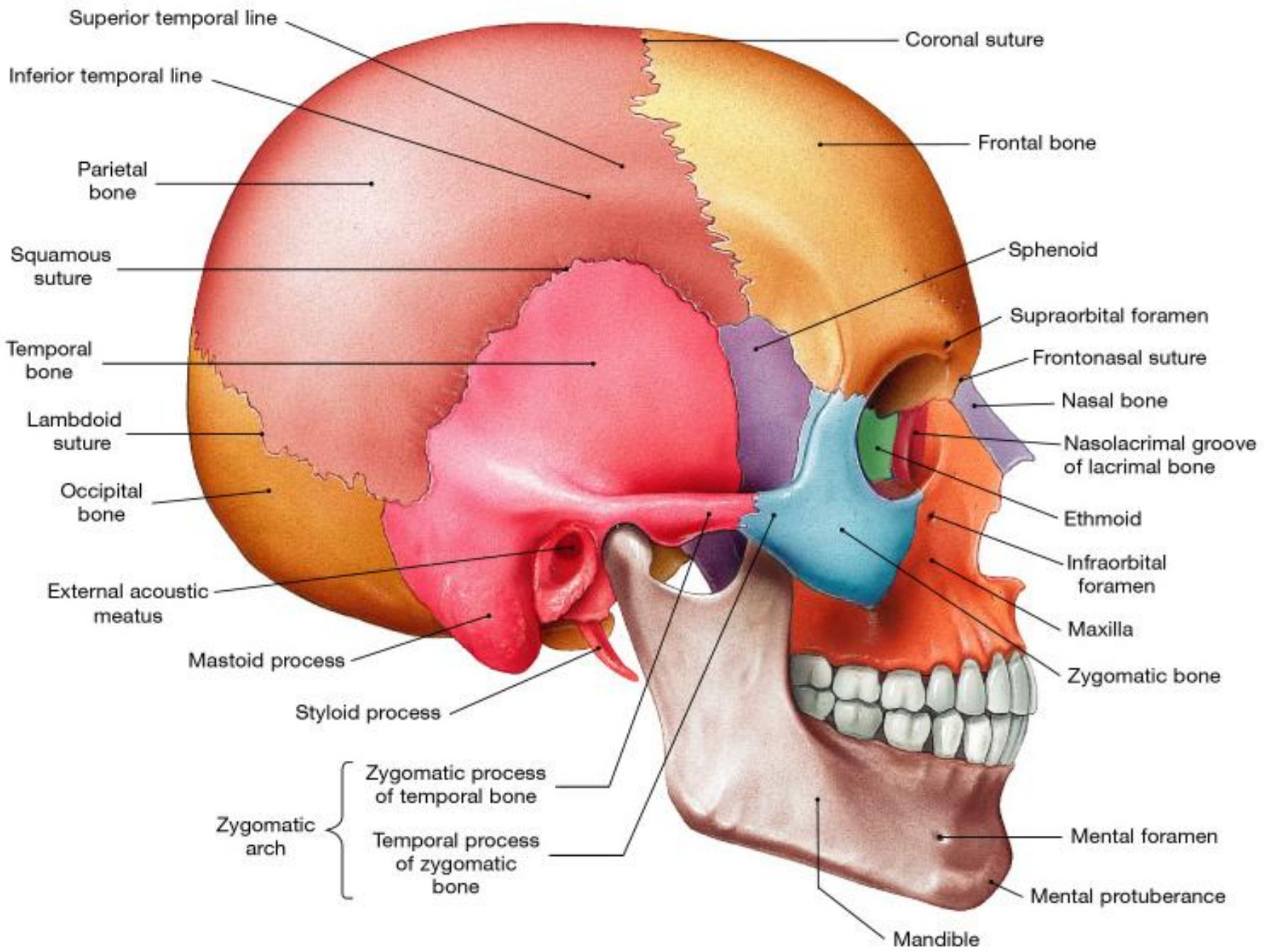
- Immovable joints
- Form boundaries between skull bones
- Five sutures
  - Coronal
  - Sagittal
  - Lambdoid
  - Squamous
  - Frontonasal

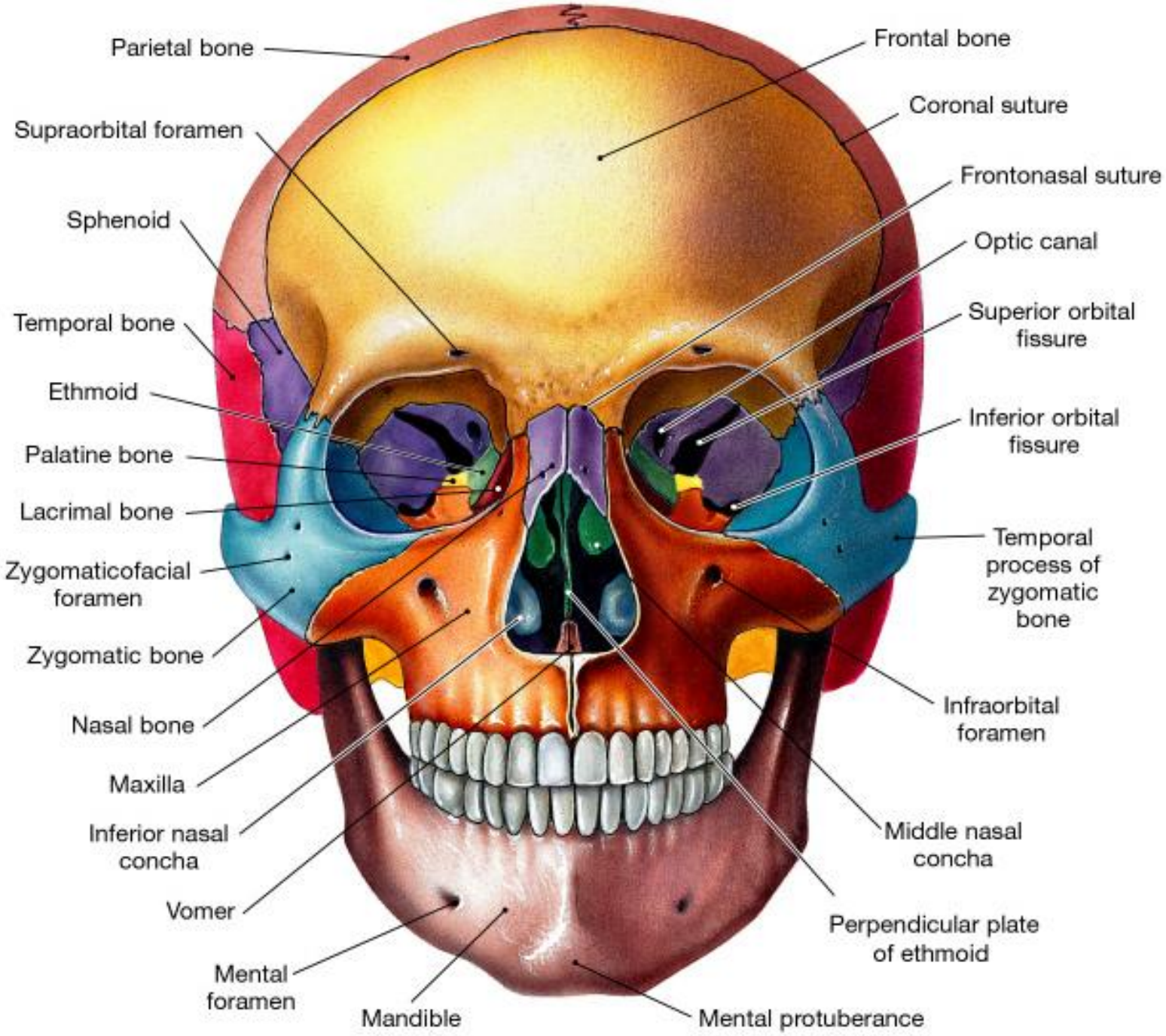


(a) Posterior view

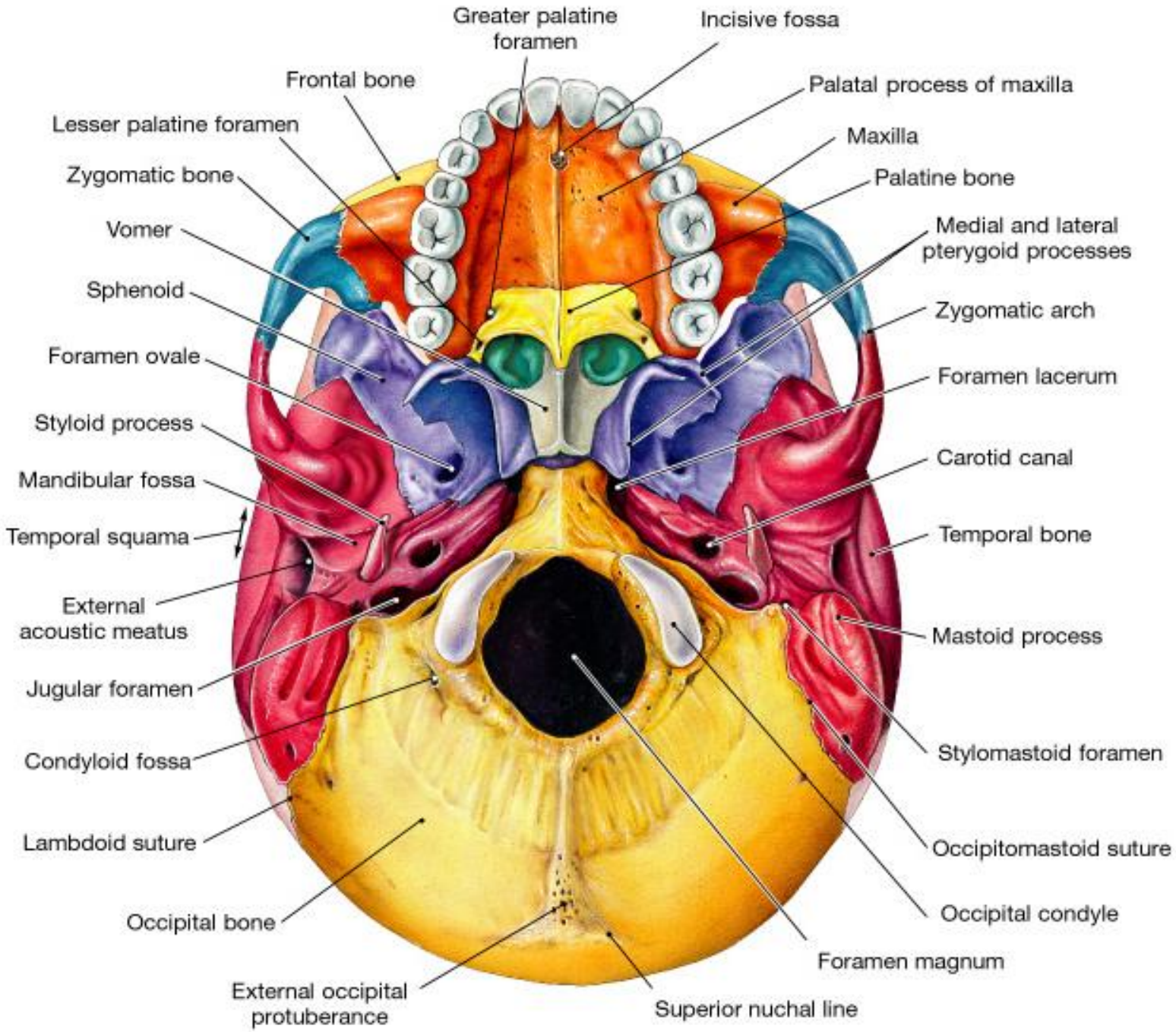


(b) Superior view


Superior temporal line
Inferior temporal line
Parietal bone
Squamous suture
Temporal bone
Lambdoid suture
Occipital bone
External acoustic meatus
Mastoid process
Styloid process
Zygomatic arch
Zygomatic process of temporal bone
Temporal process of zygomatic bone
Coronal suture
Frontal bone
Sphenoid
Supraorbital foramen
Frontonasal suture
Nasal bone
Nasolacrimal groove of lacrimal bone
Ethmoid
Infraorbital foramen
Maxilla
Zygomatic bone
Mental foramen
Mental protuberance
Mandible



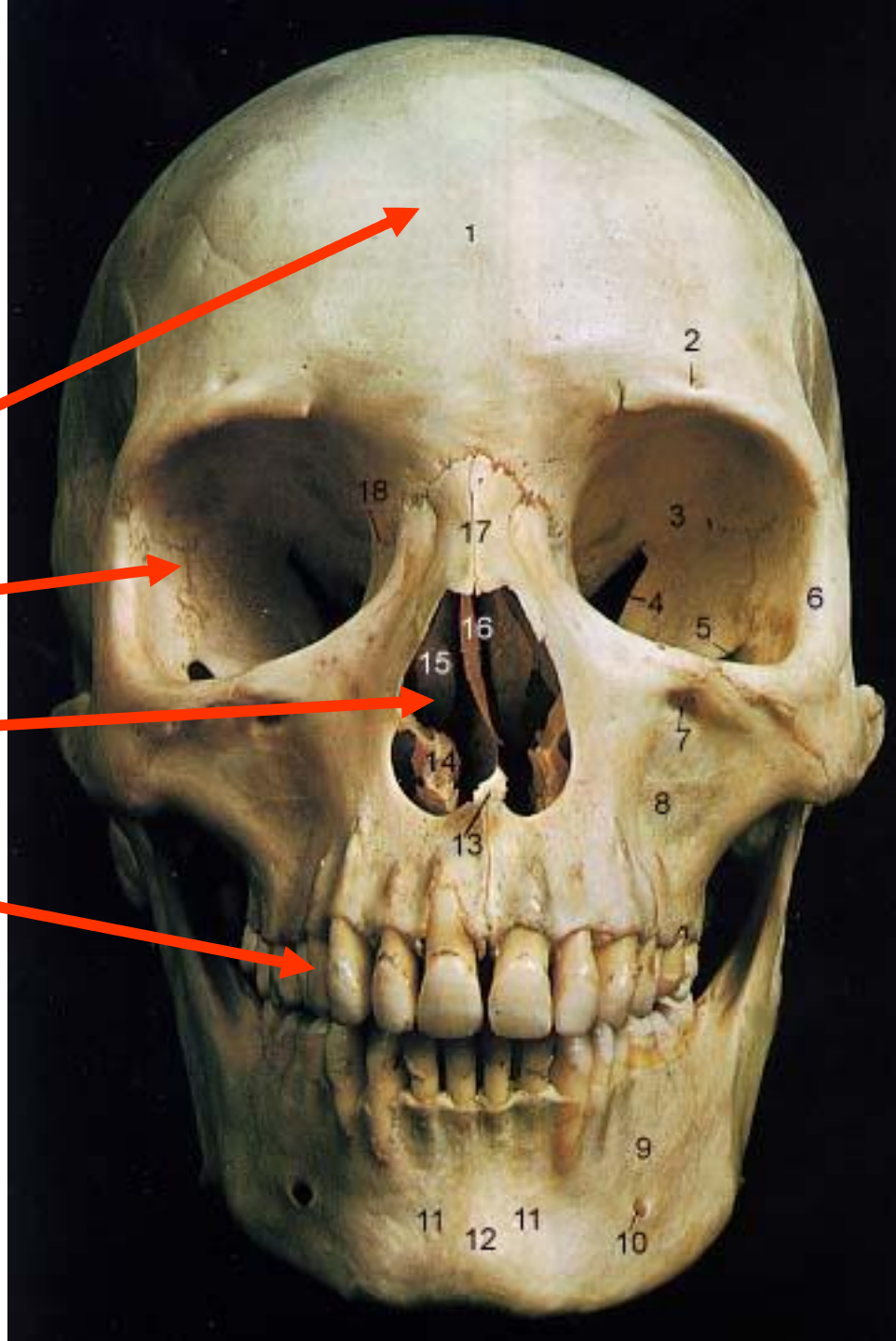
(d) Anterior view



(e) Inferior view, mandible removed

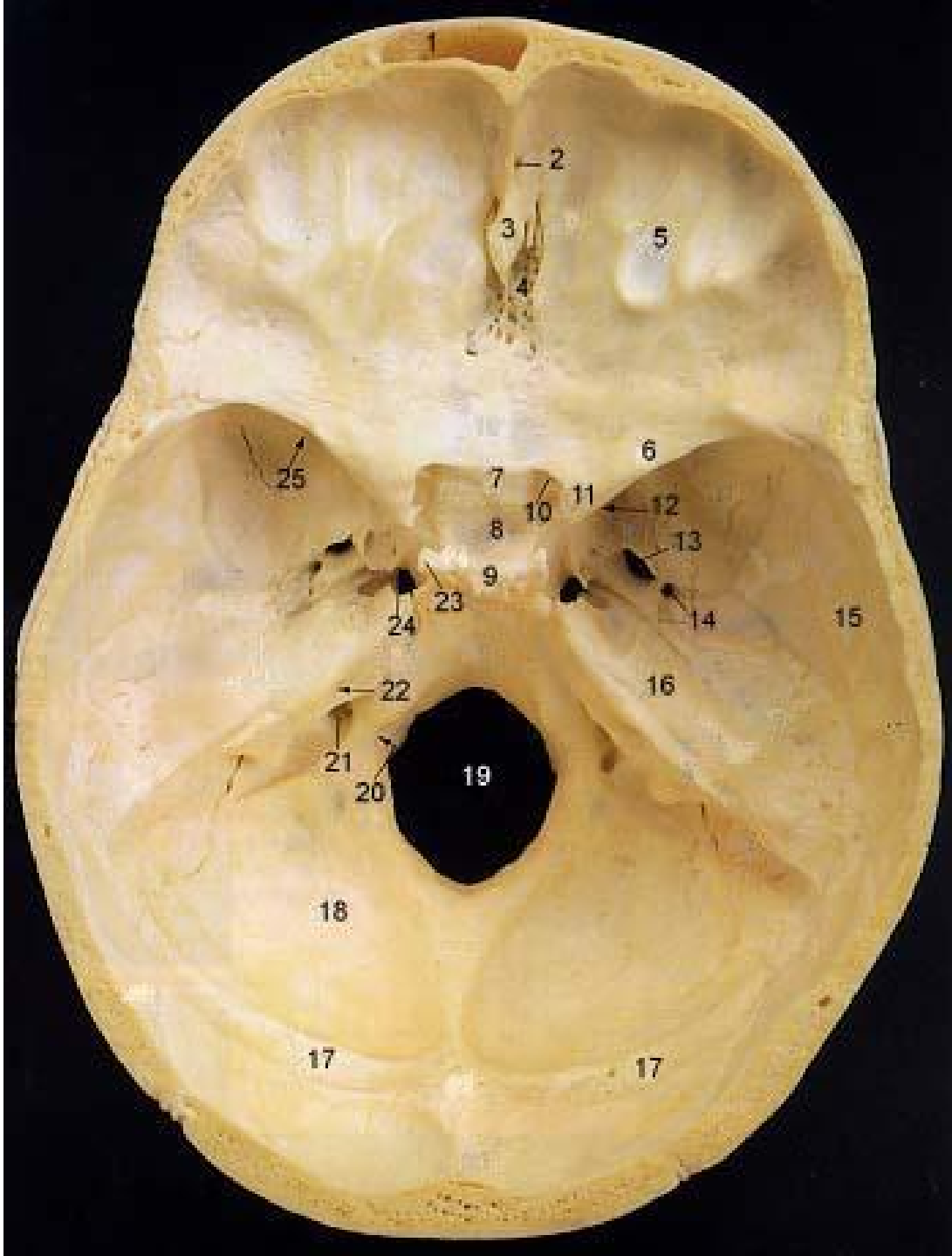
Contains several cavities

- Cranial cavity
- Orbit
- Nasal cavity
- Buccal cavity
- Paranasal sinuses
- Inner-ear cavities

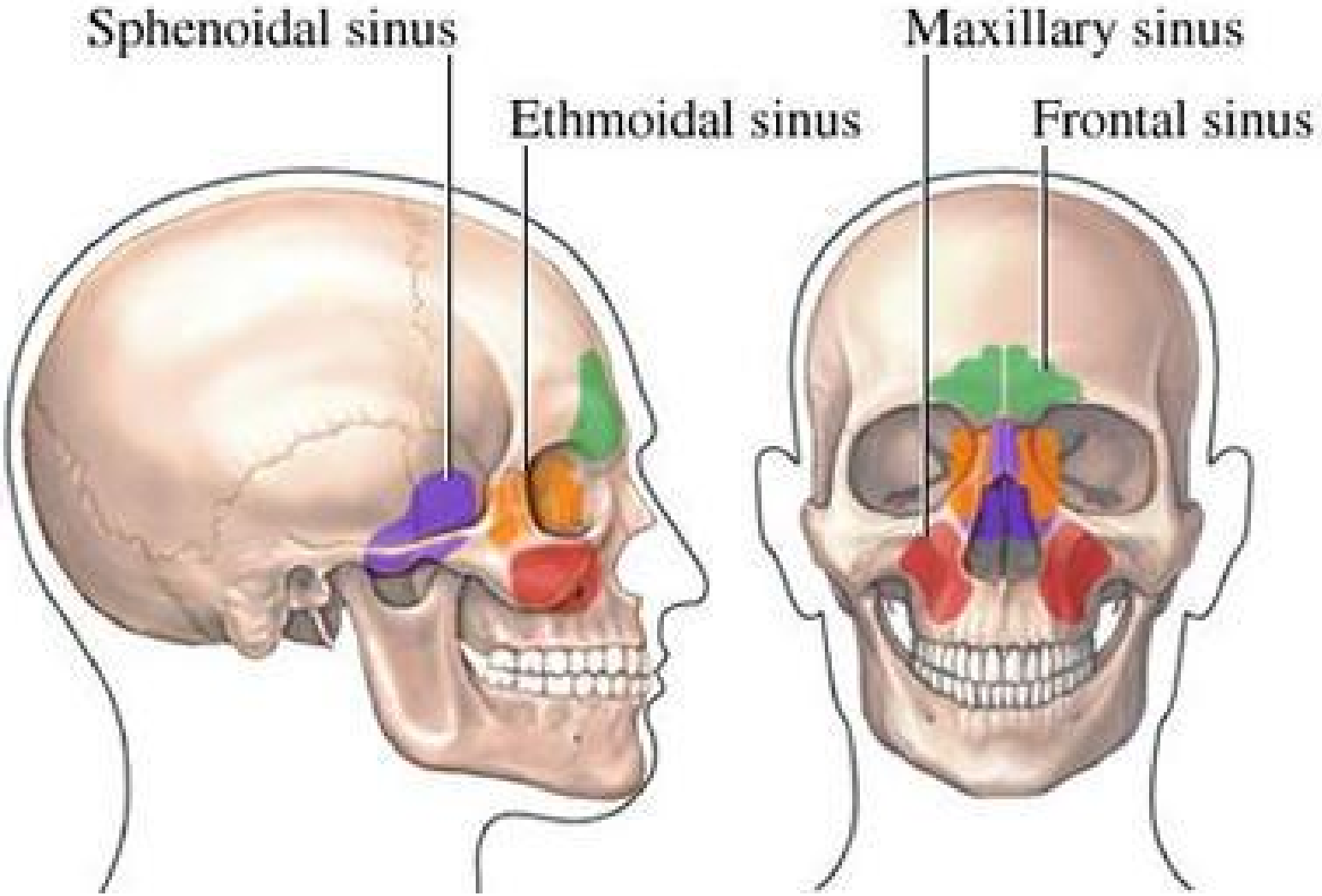


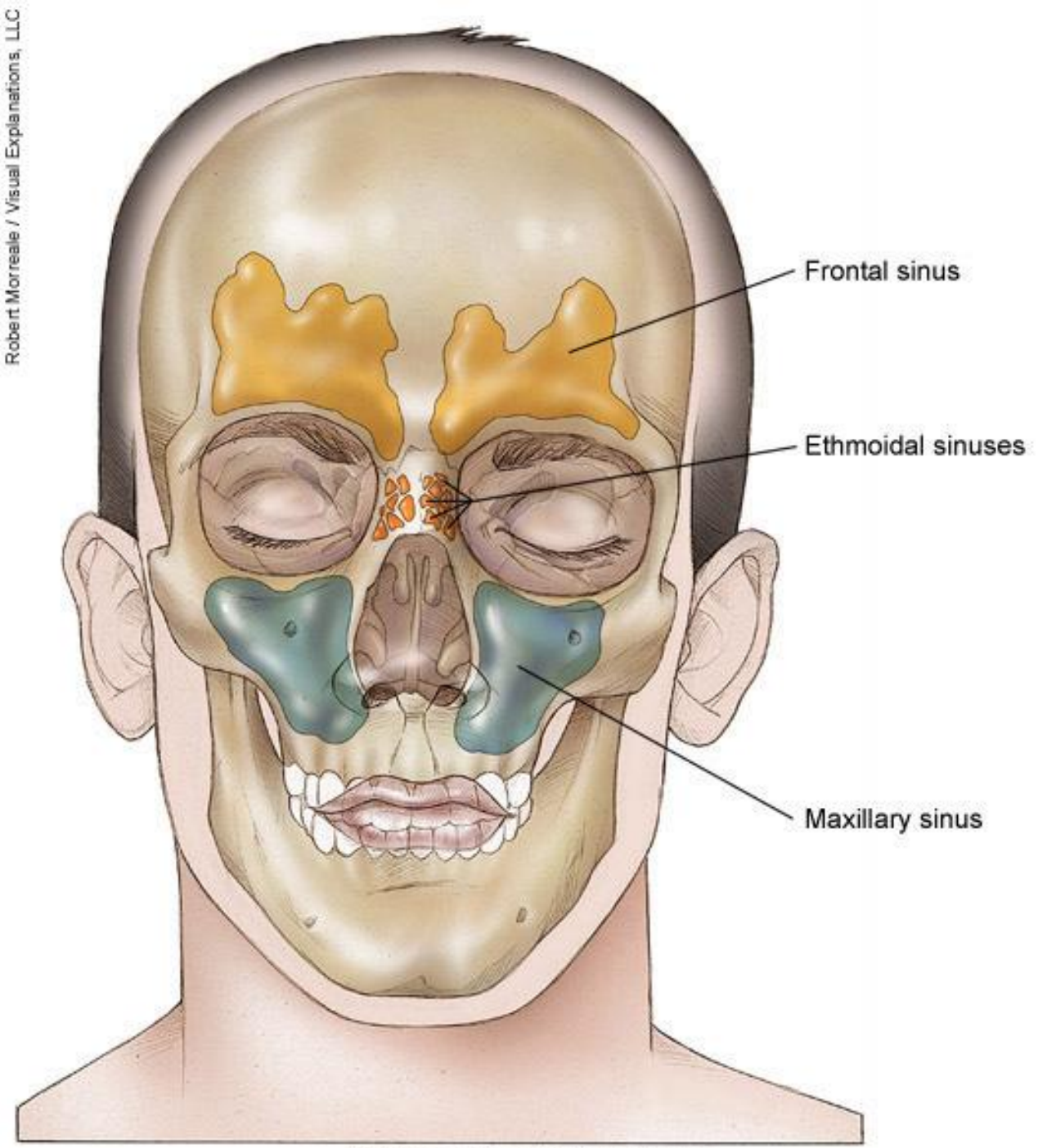
Cranial Cavity

- Anterior cranial fossa
- Middle cranial fossa
- Fosterior cranial fossa



Paranasal Sinuses





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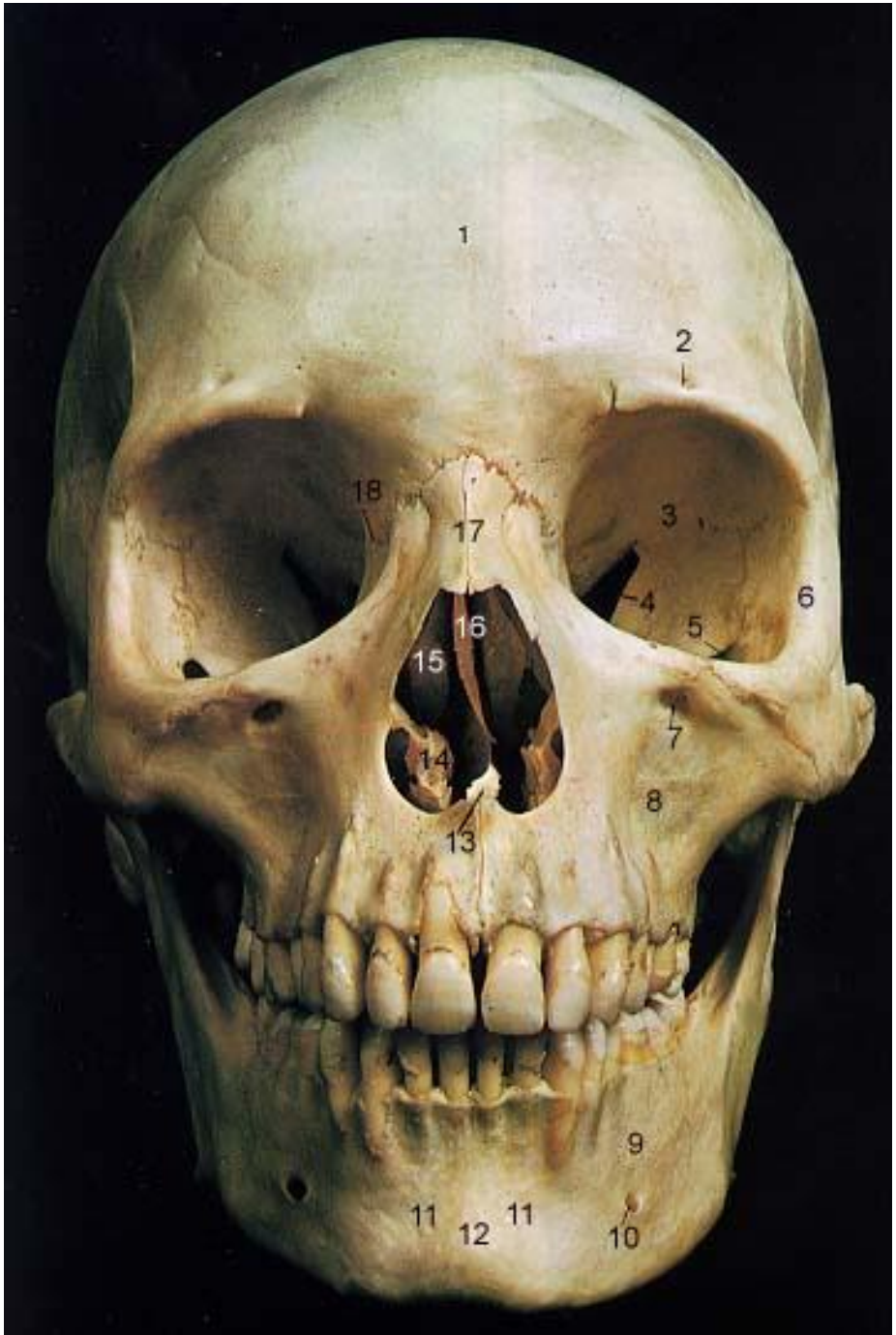
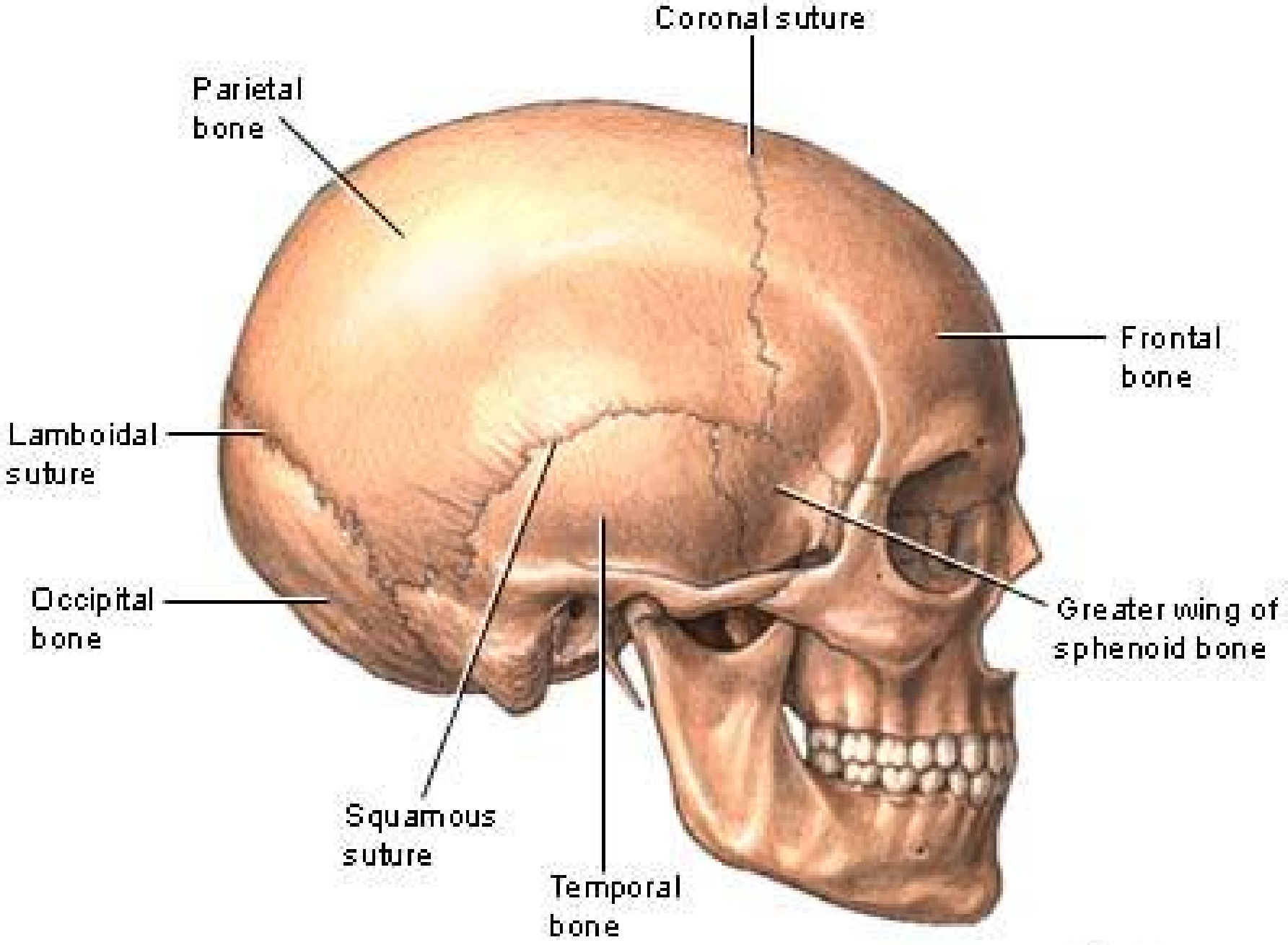
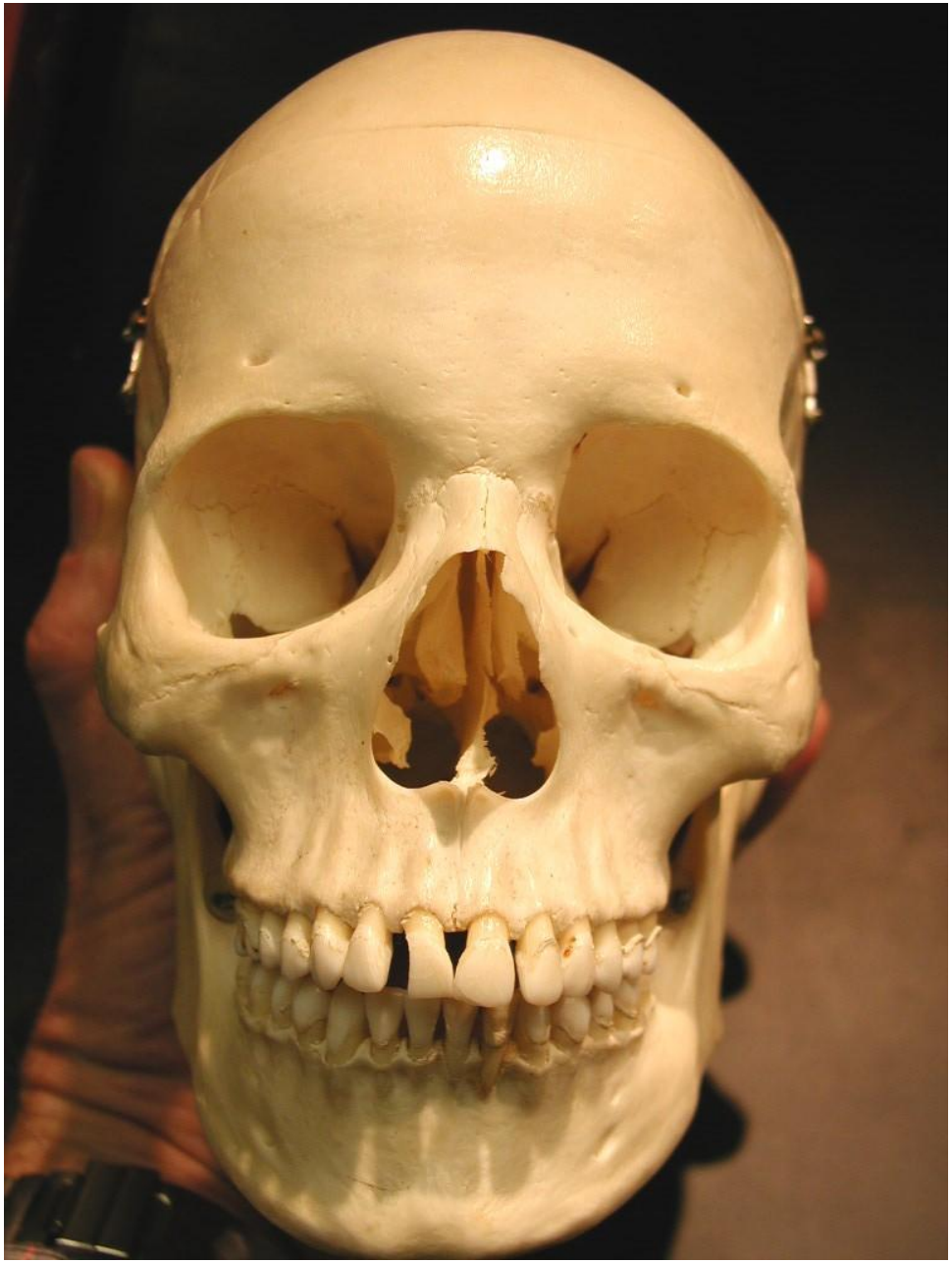
Cranial Bones

- 1frontal
- 2 parietal
- 2 temporal
- 1 occipital
- 1 sphenoid
- 1 ethmoid




Coronal suture
Parietal bone
Frontal bone
Lamboidal suture
Occipital bone
Greater wing of sphenoid bone
Squamous suture
Temporal bone
A.D.A.M.



Frontal Bone

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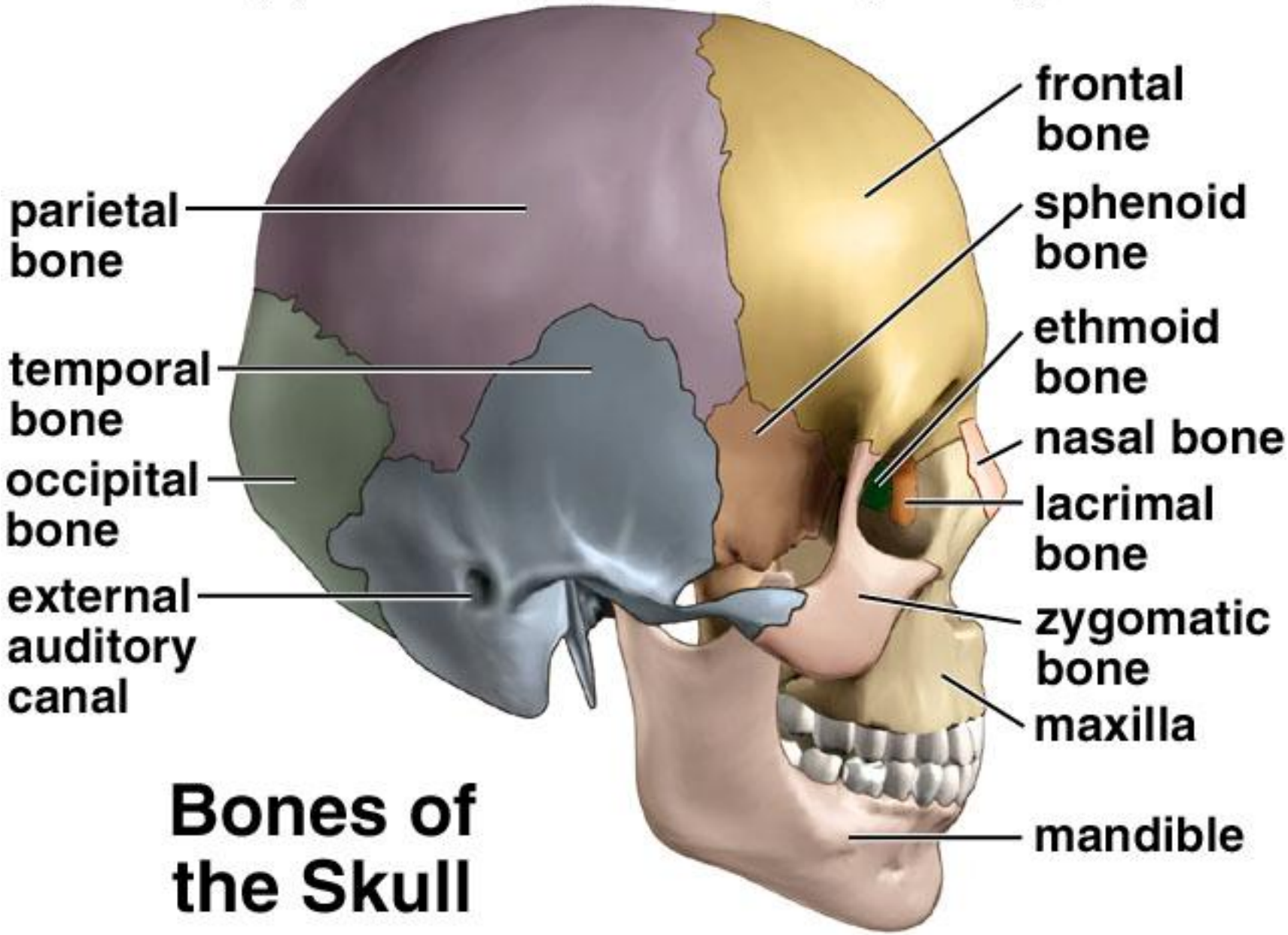

Bones of the Skull

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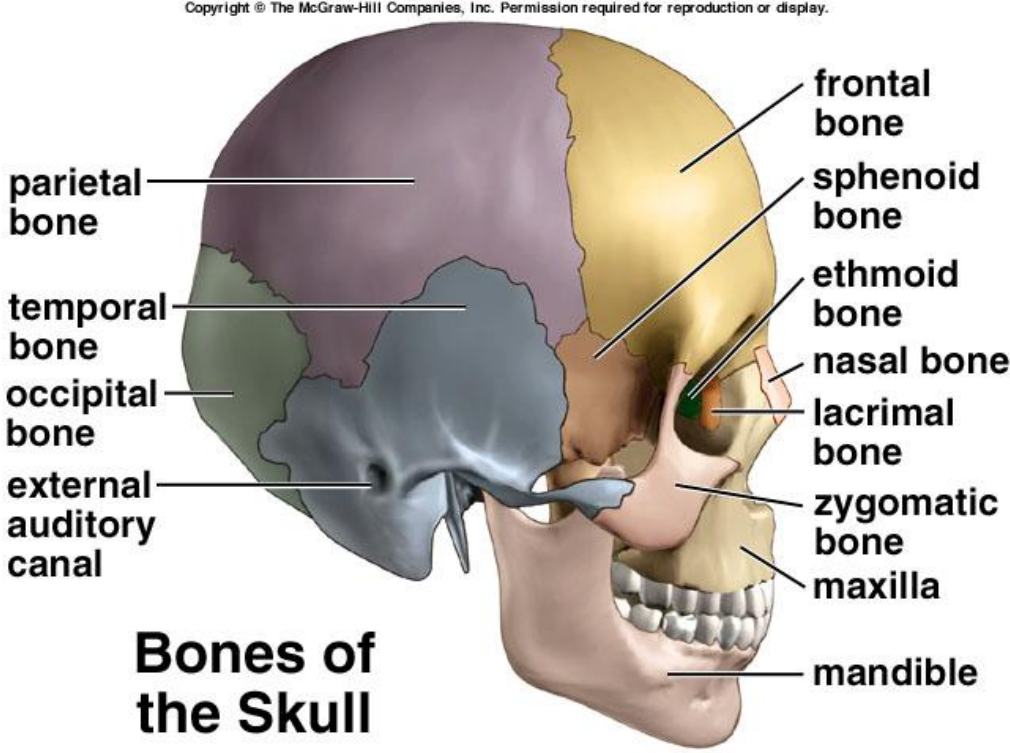
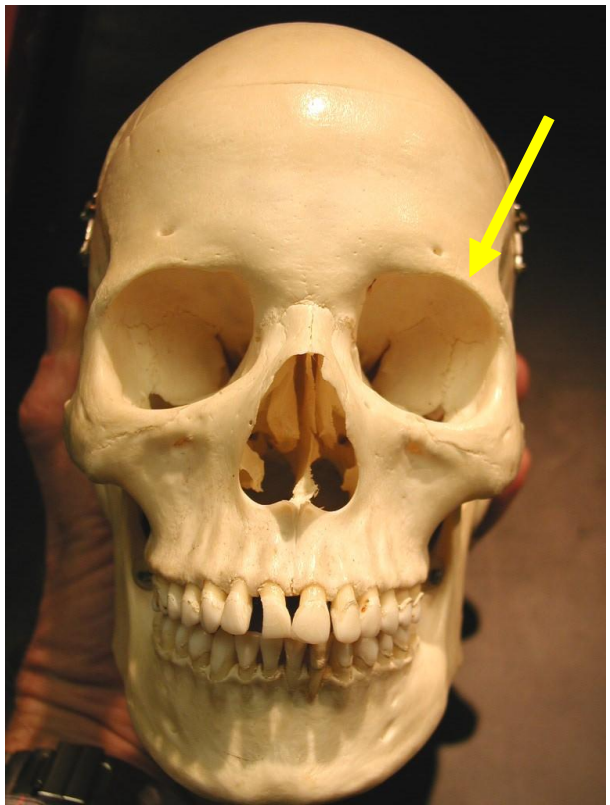


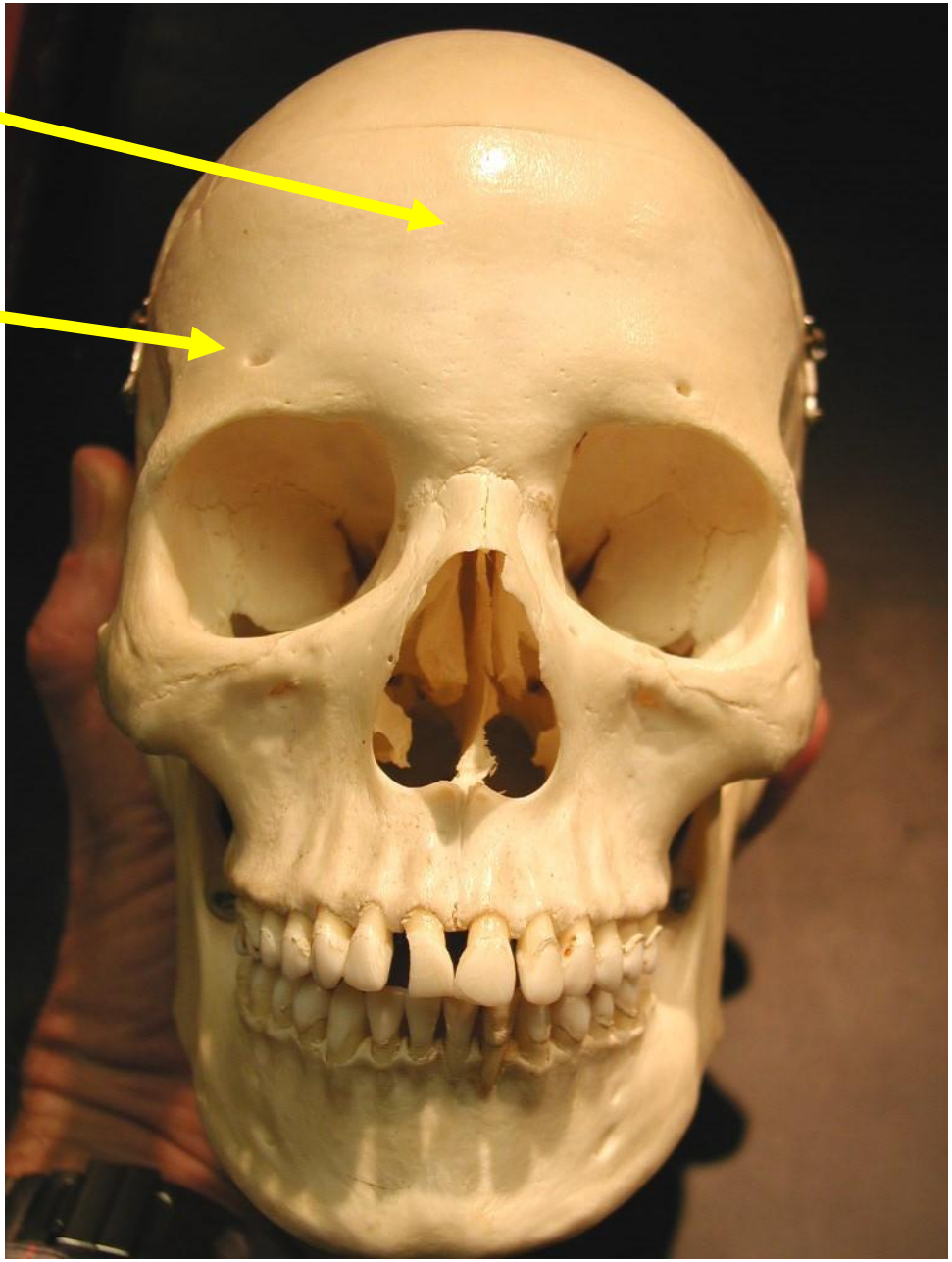
- Extends from the supra orbital margin to the coronal suture



Frontal Bone

Gabella- smooth area of the frontal bone

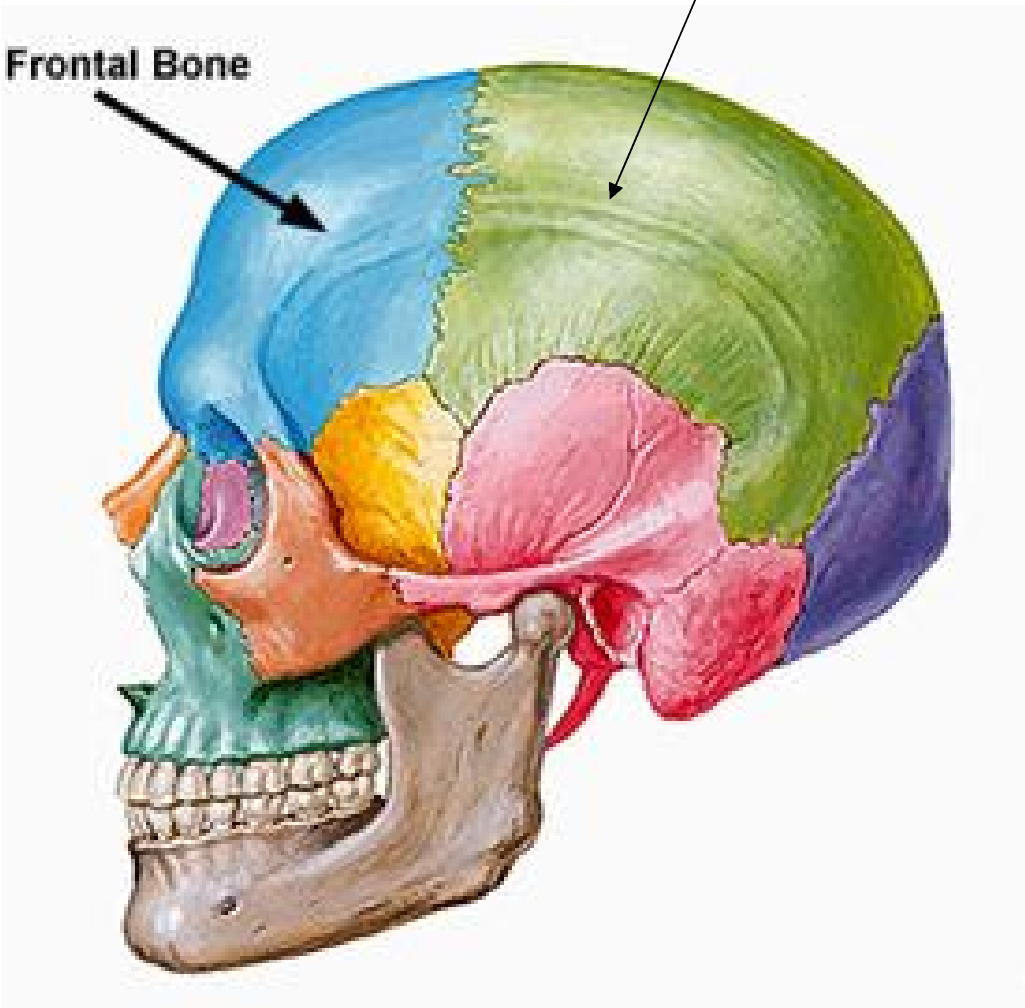
Margin is perforated by the **supraorbital foramen or** (supraorbital notch)

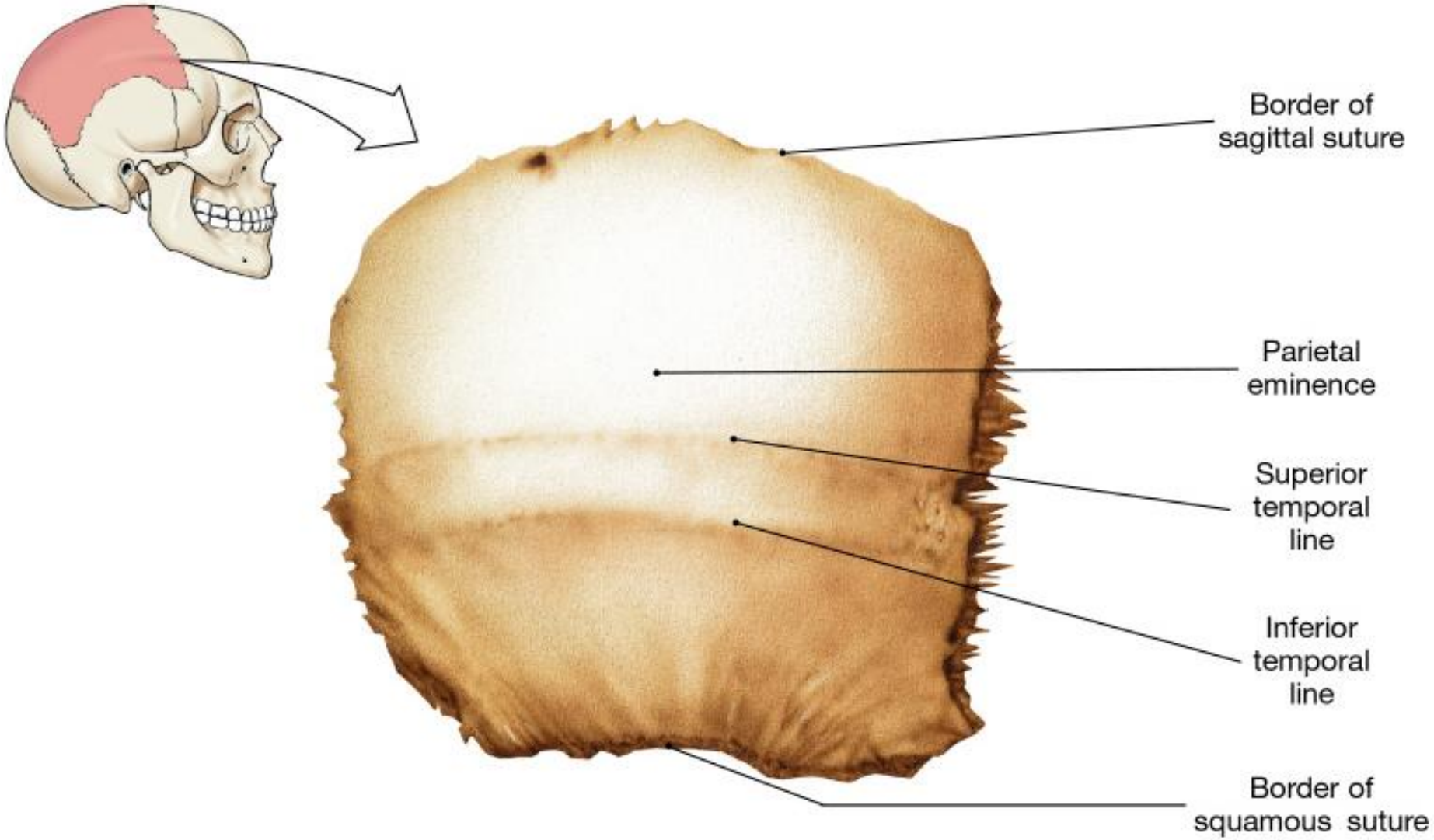


Parietal Bone

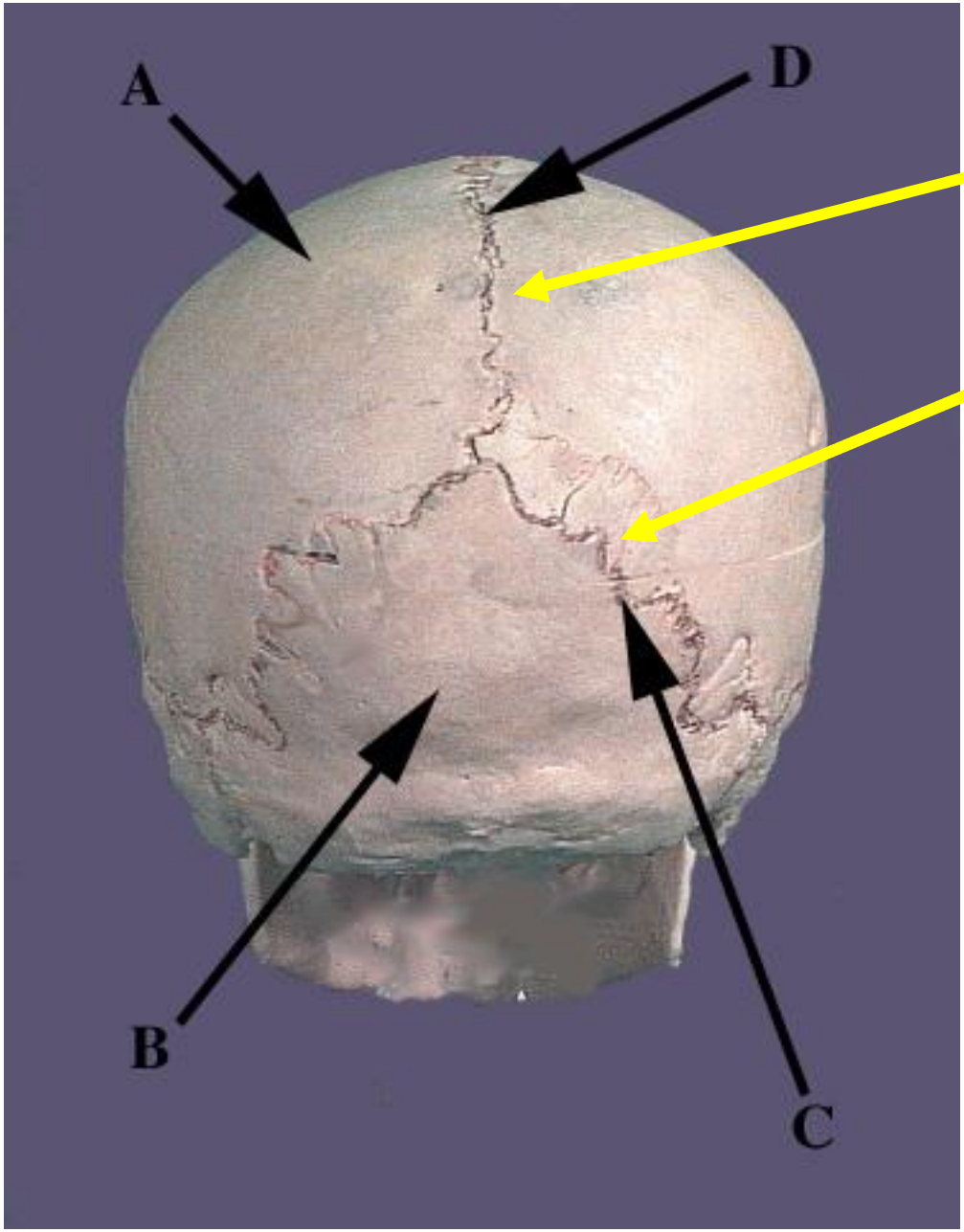
Parietal Bone

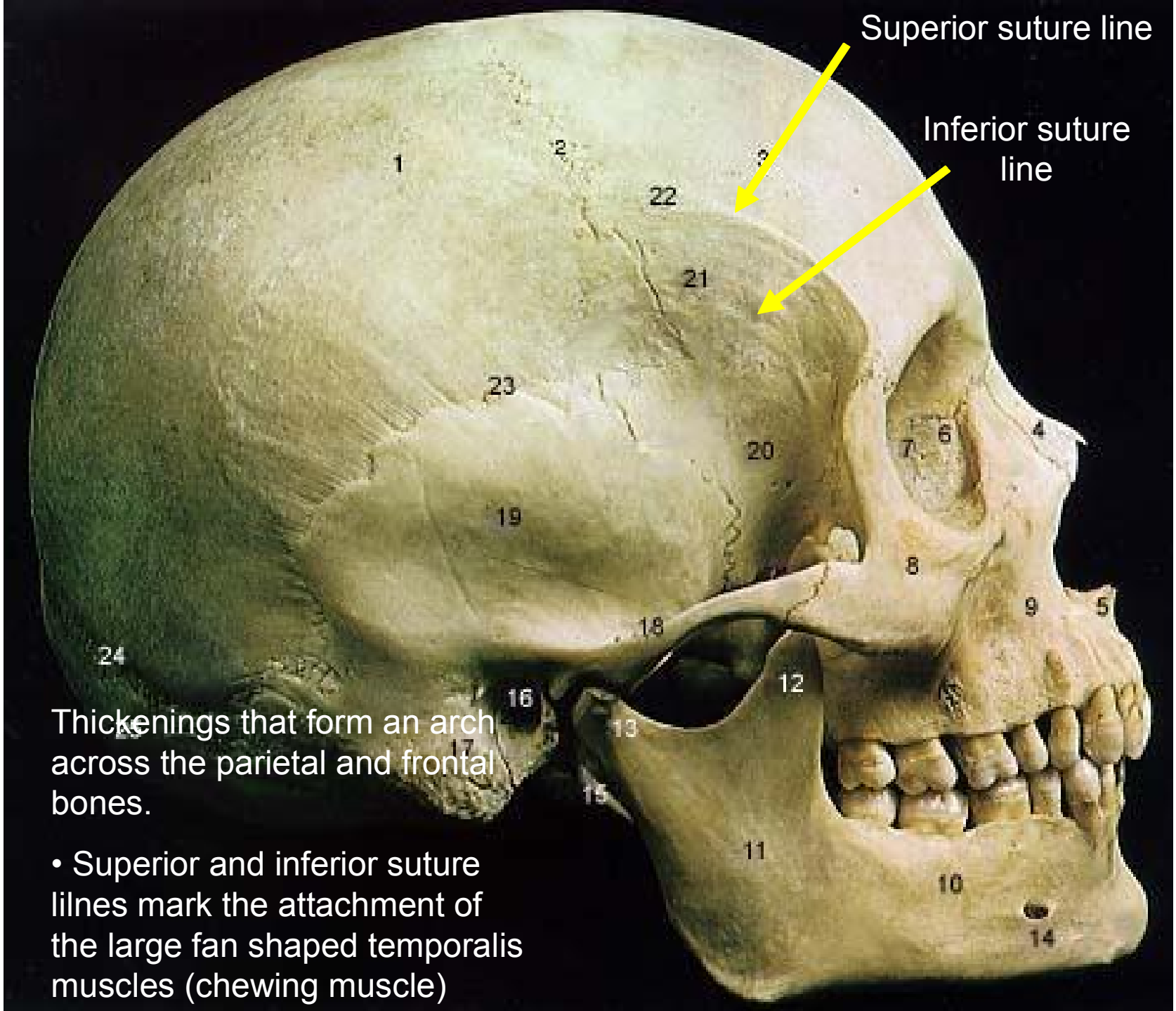
- Bordered by 4 sutures
  - Sagittal
  - Coronal
  - Lambdoid
  - squamous
- Temporal Lines
  - superior and inferior
    - attachment for the temporalis muscle, a chewing muscle that passes between the zygomatic arch and temporal bone and inserts on the mandible





(c) Parietal bone, external surface

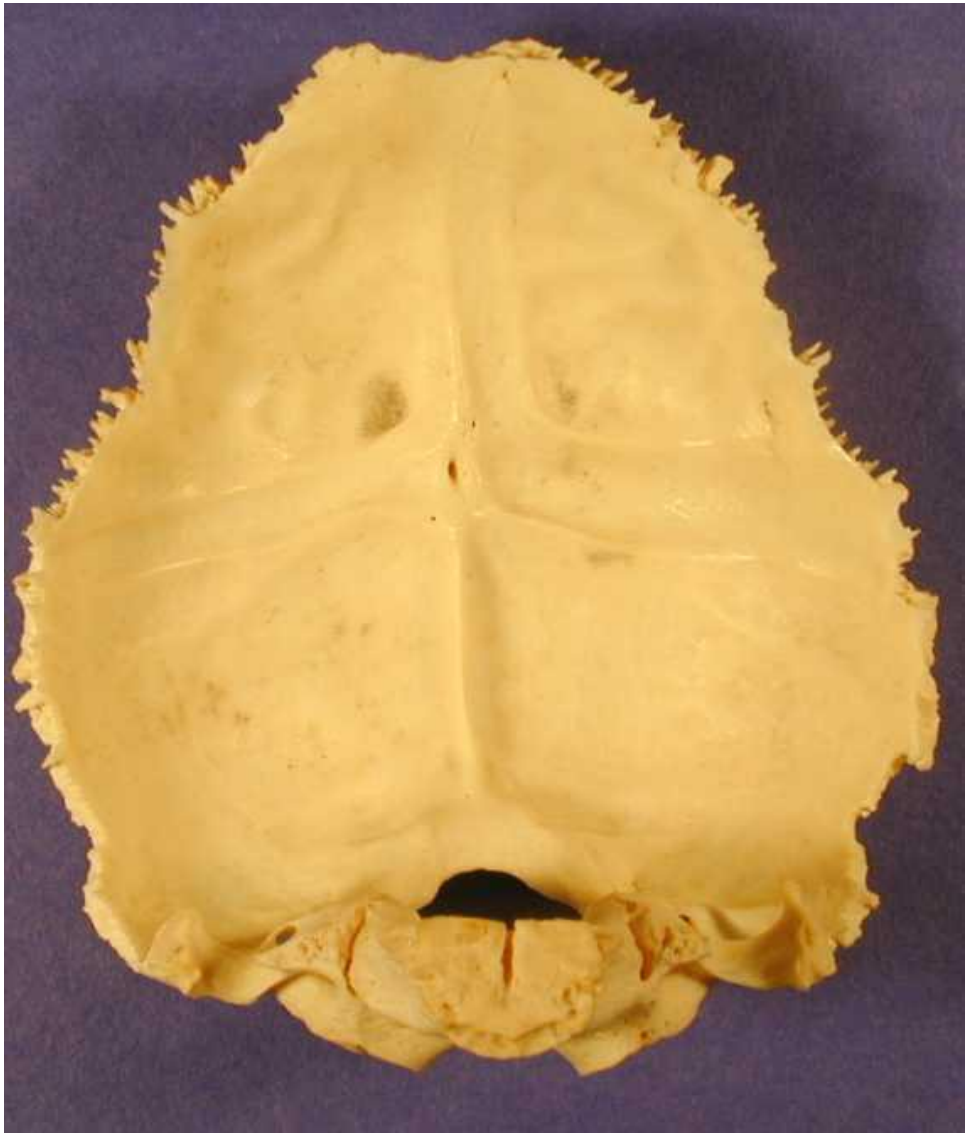

A
D
Sagittal suture
Lambdoid suture
B
C



Thickenings that form an arch across the parietal and frontal bones.

• Superior and inferior suture lilnes mark the attachment of the large fan shaped temporalis muscles (chewing muscle)

Occipital Bone



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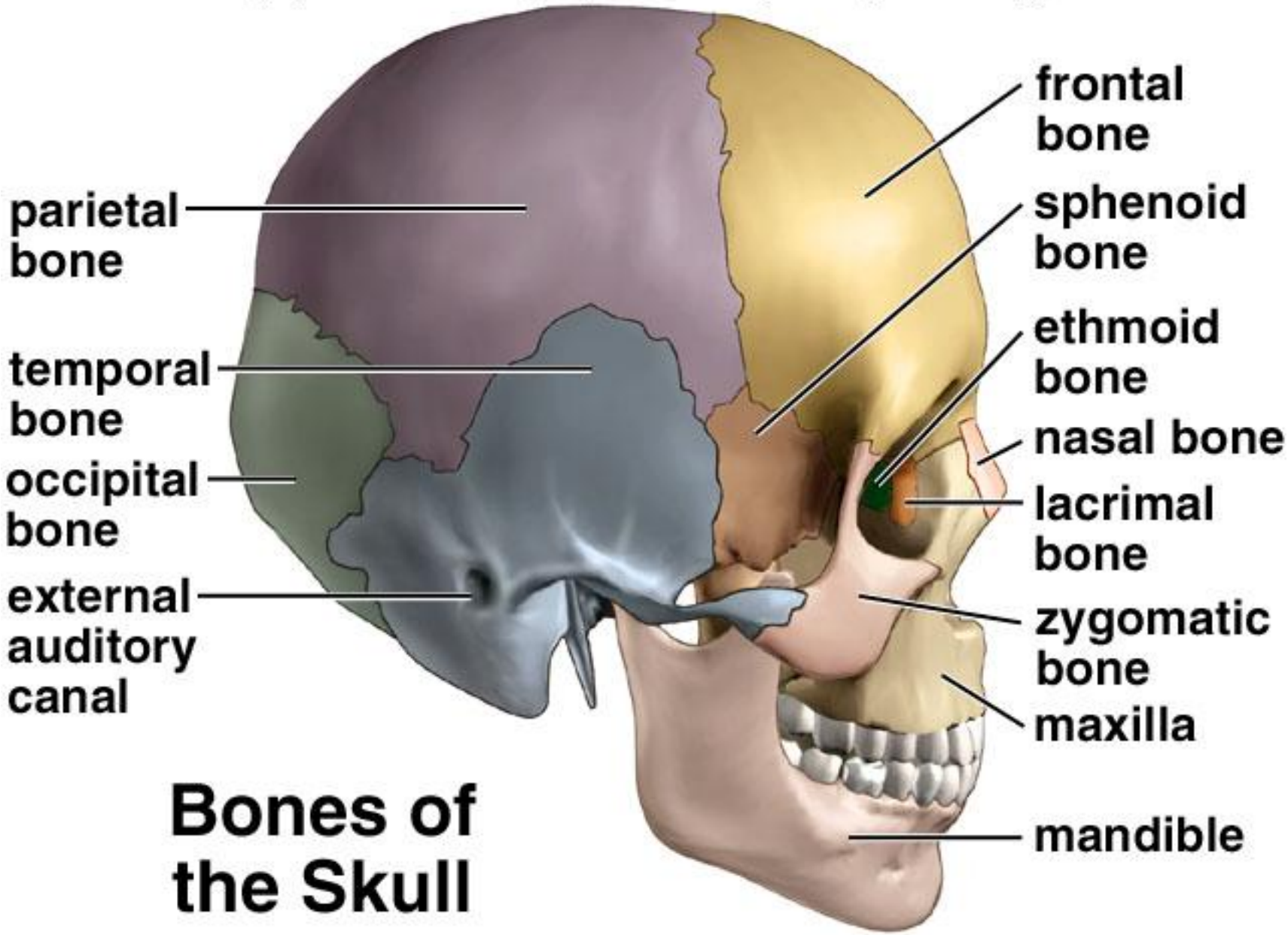
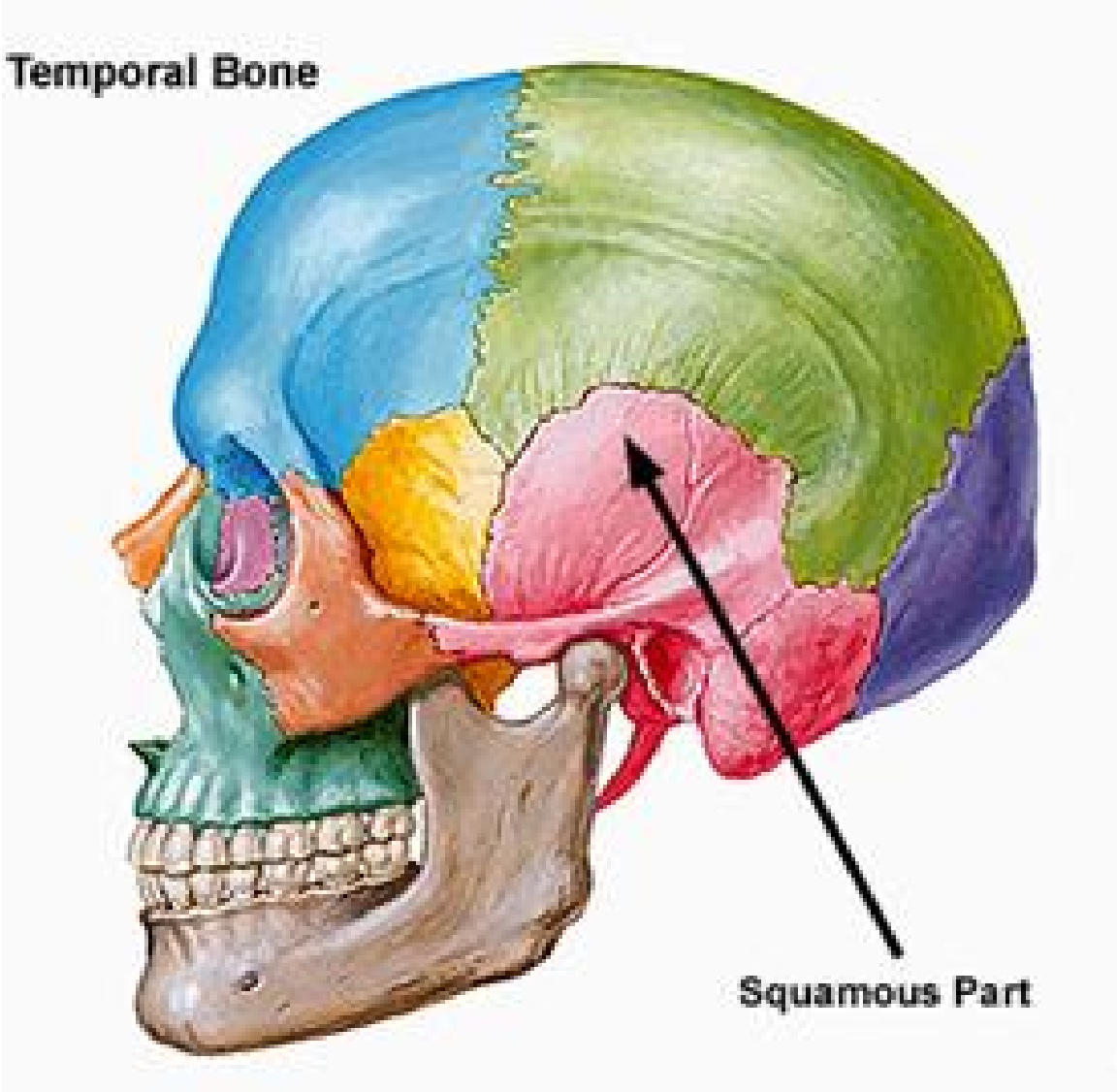


Bones of the Skull

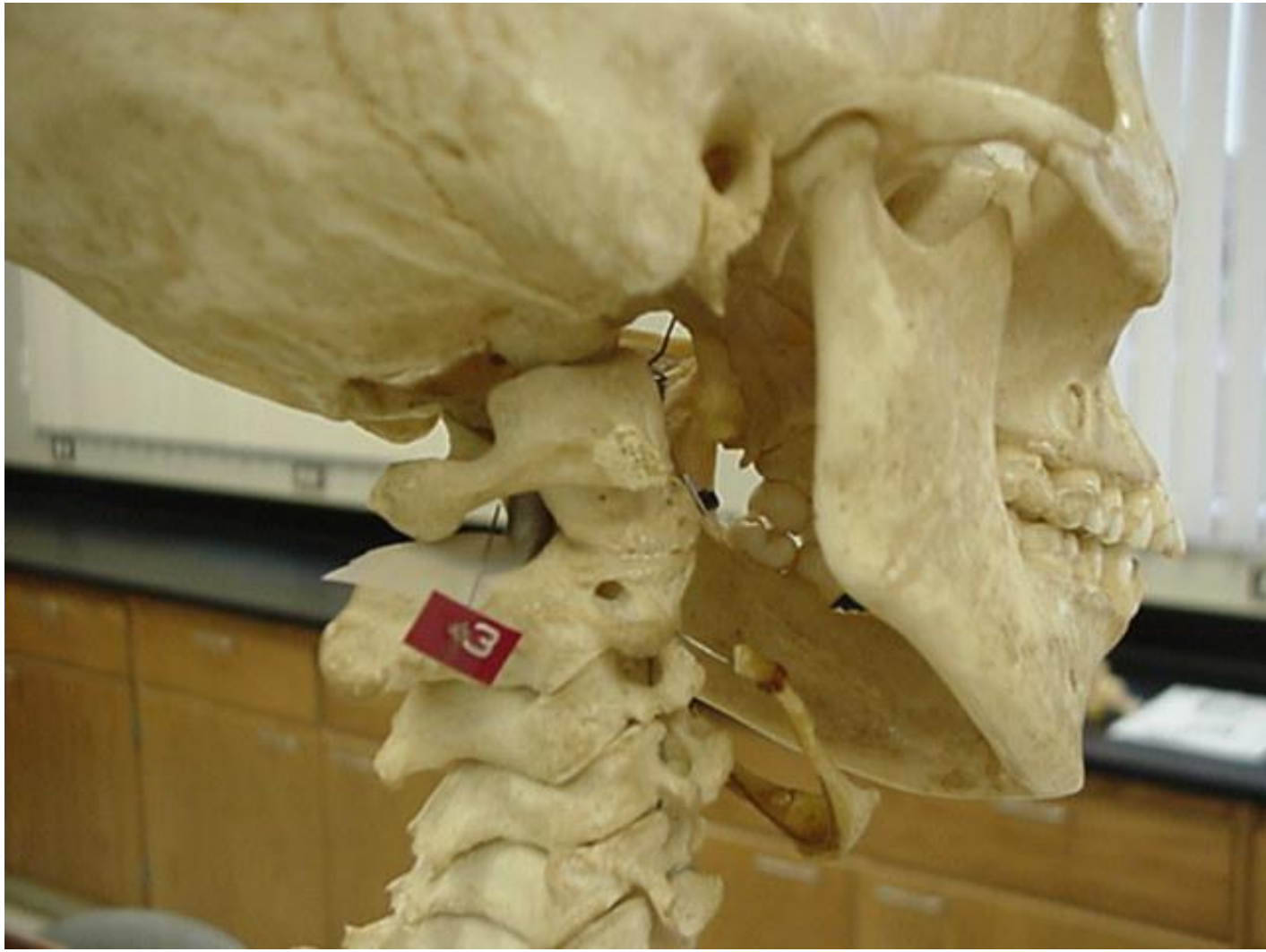
Temporal Bone

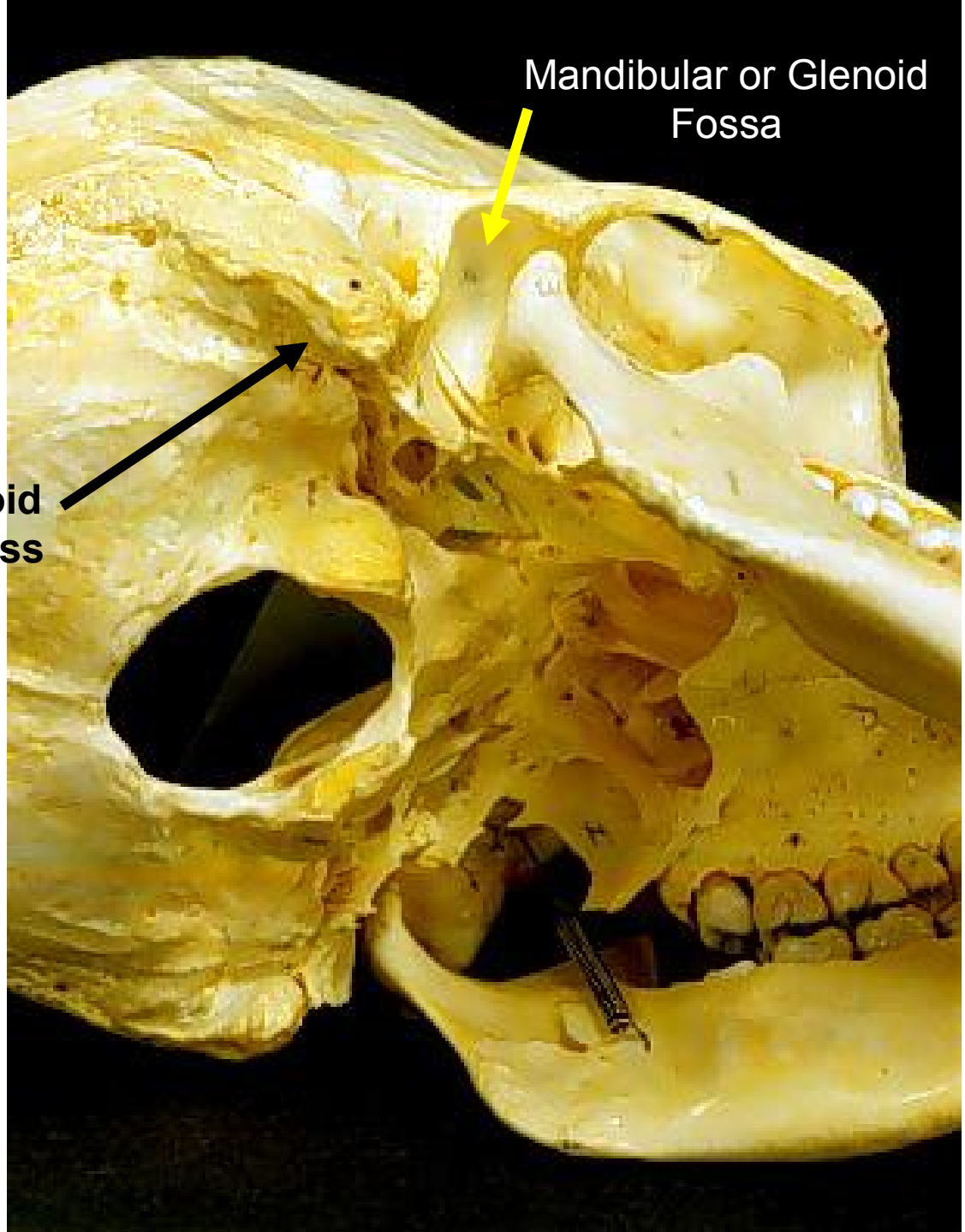
Four Parts of the Temporal Bone

1. **<u>Squamous part-</u>** has two prominent features
   - **Zygomatic process-** which forms part of the **zygomatic arc** (cheekbone)
   - Mandibular fossa



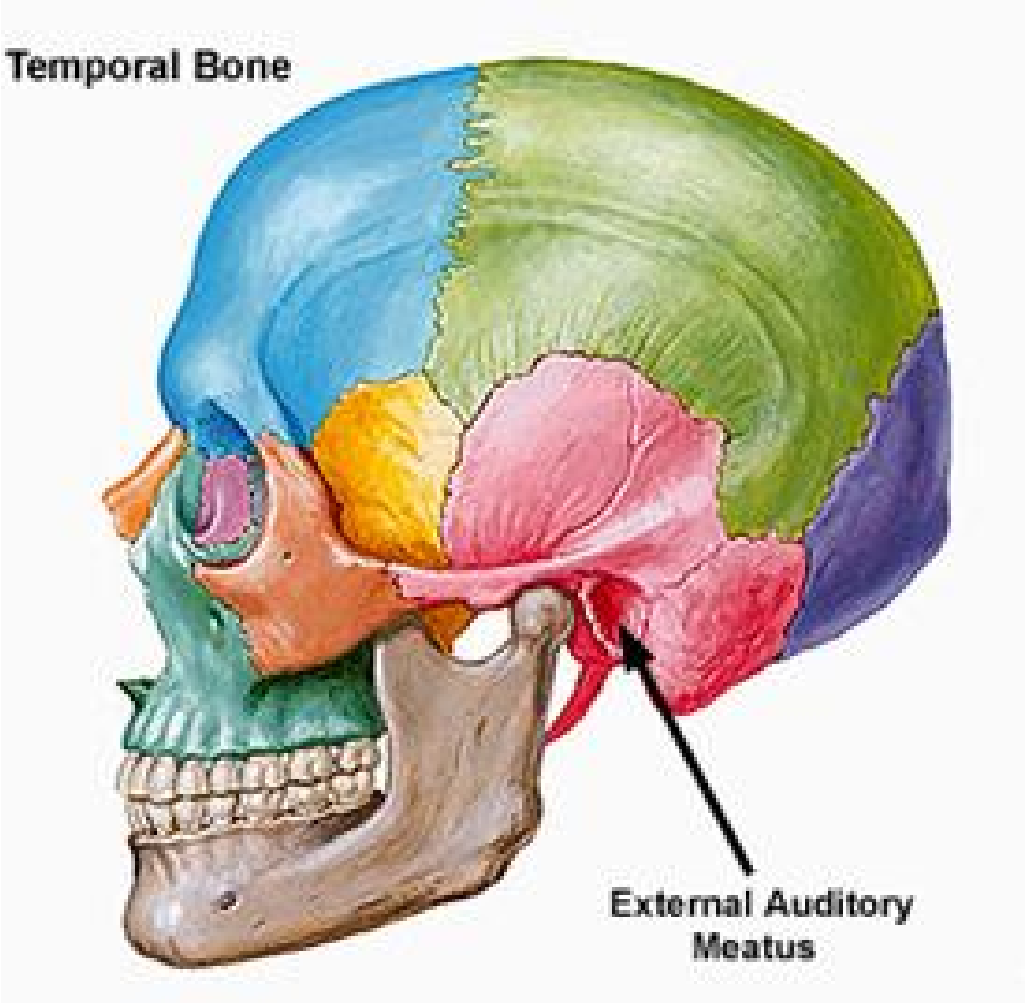
- **Mandibular (glenoid) fossa-** a depression where the mandible articulates with the cranium




Mandibular or Glenoid Fossa
Mastoid process

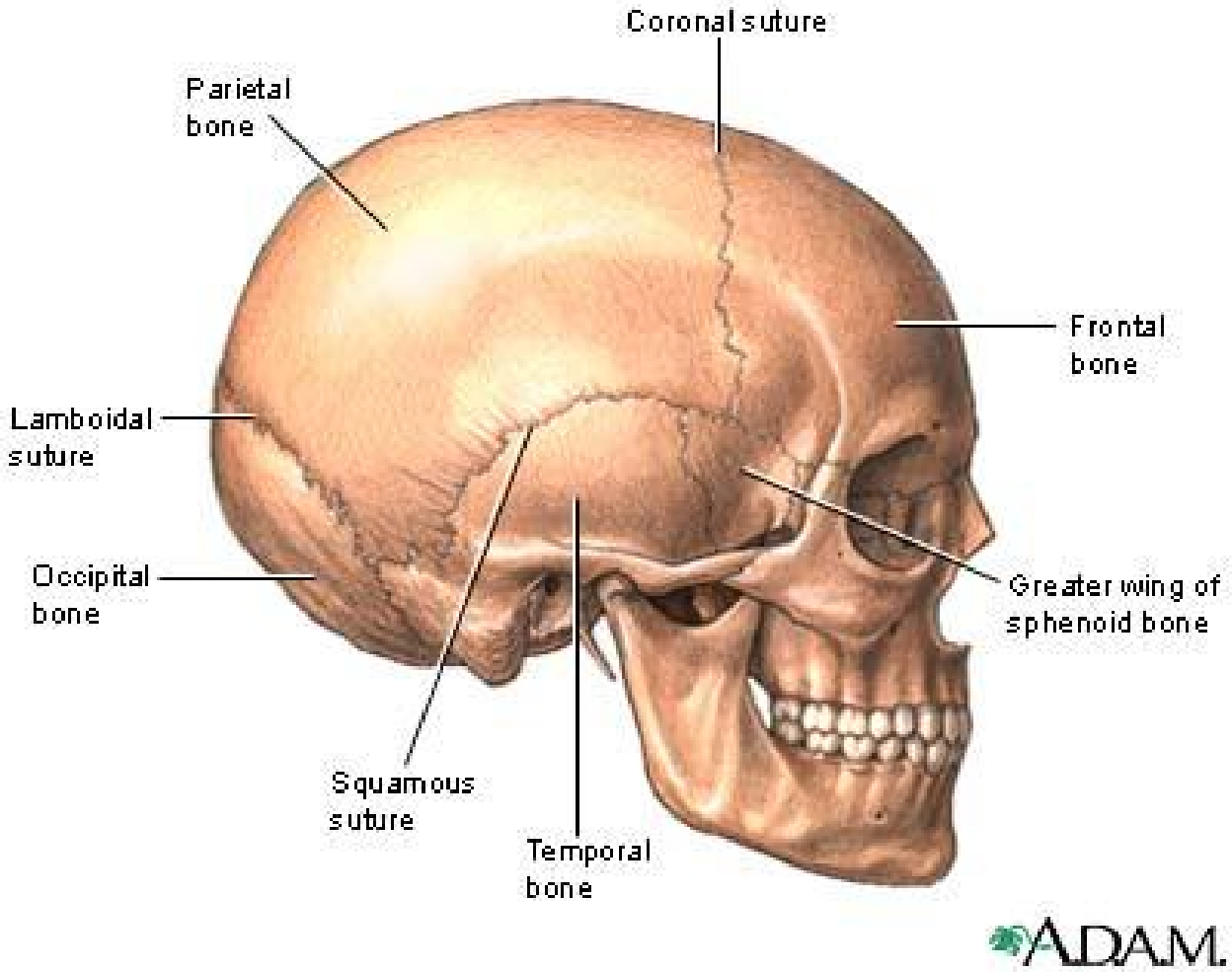
Four Parts of theTemporal Bone

2. **<u>Tympanic part-</u>** a small ring of bone that borders the **external acoustic meatus**
   - **Styloid process-** a pointed spine on its inferior surface
     - Provides attachment for muscles of the tongue, pharynx, and hyoid bone



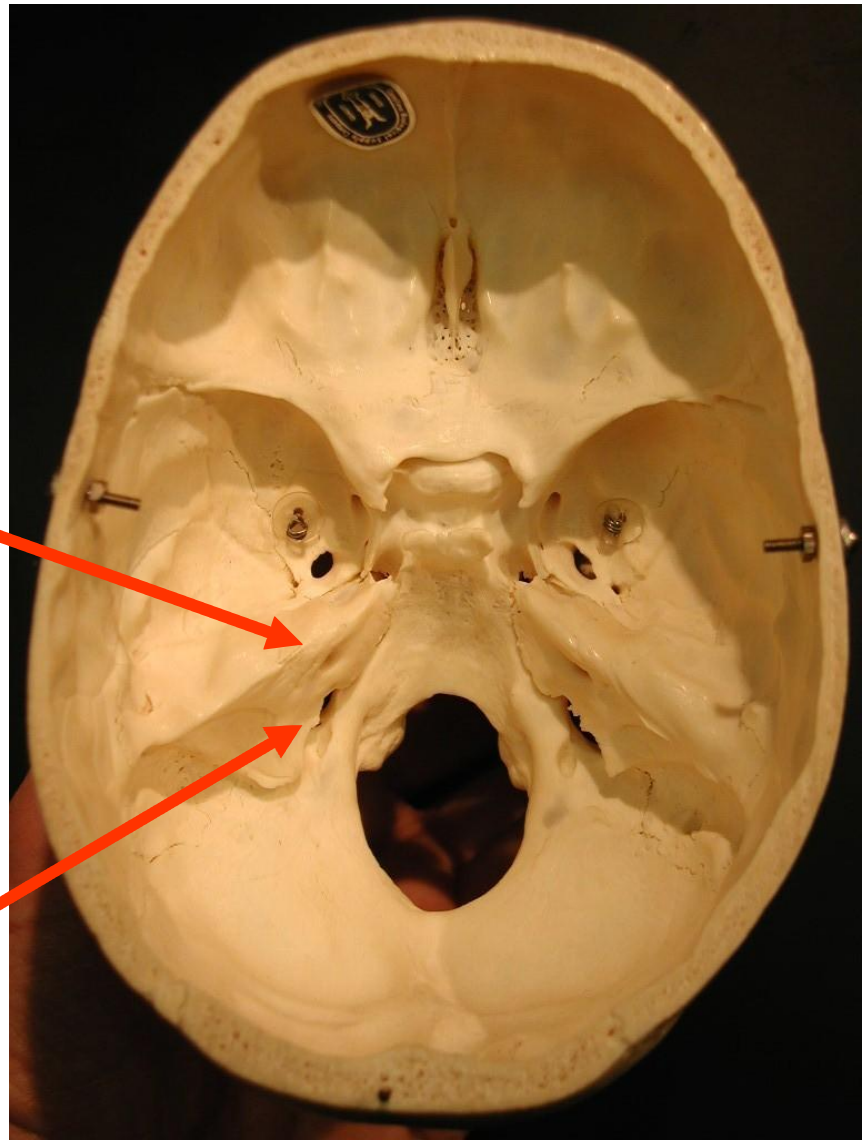
Four Parts of theTemporal Bone

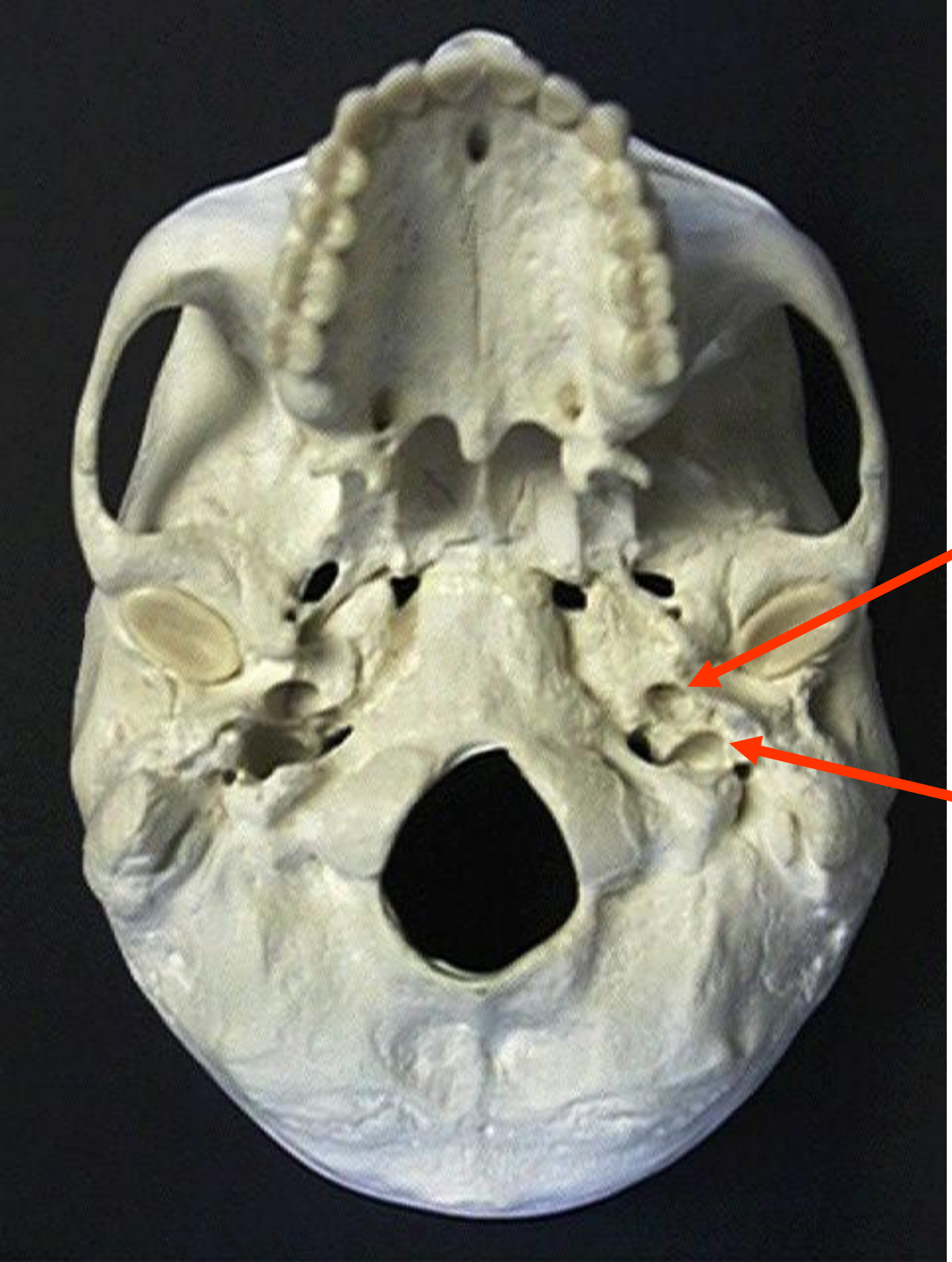
3. **Mastoid part**
   - **Mastoid process-** prominent lump behind the earlobe
     - Filled with ear sinuses that communicate with the middle-ear cavity
     - Can become infected (mastoiditis) and possible spread to the brain

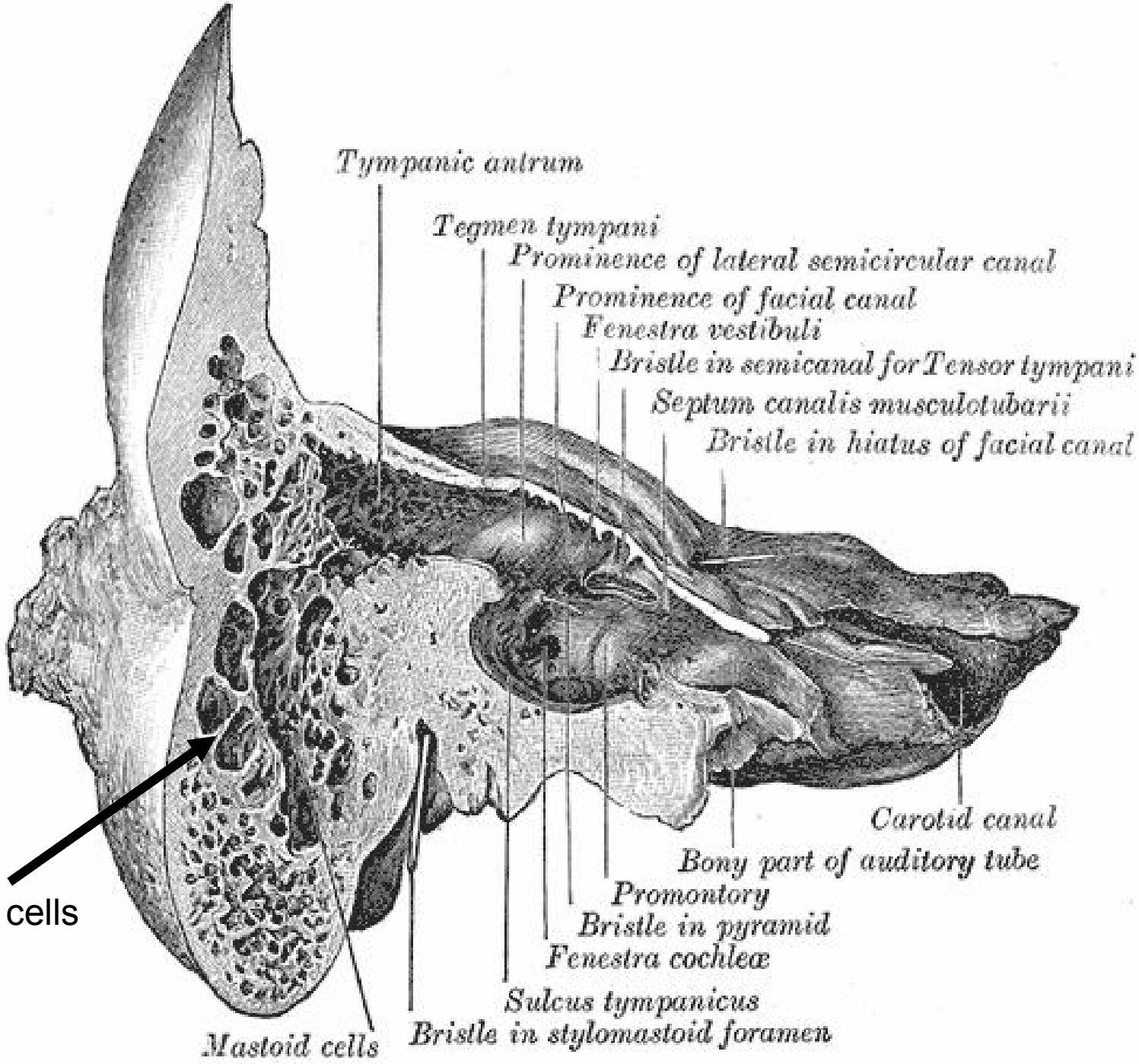


Four Parts of theTemporal Bone

4. **<u>Petrous part-</u>** resembles a little mountain range separating the middle cranial fossa from the posterior fossa
   - Houses the middle and inner ear cavities
   - **Internal acoustic meatus-** allows passage of the vestibulocochlear verve (hearing and balance)
   - **Carotid canal-** passes the internal carotid artery
   - **Jugular foramen-** fromed by the temporal bone and the occipital bone and passes the internal jugular vein

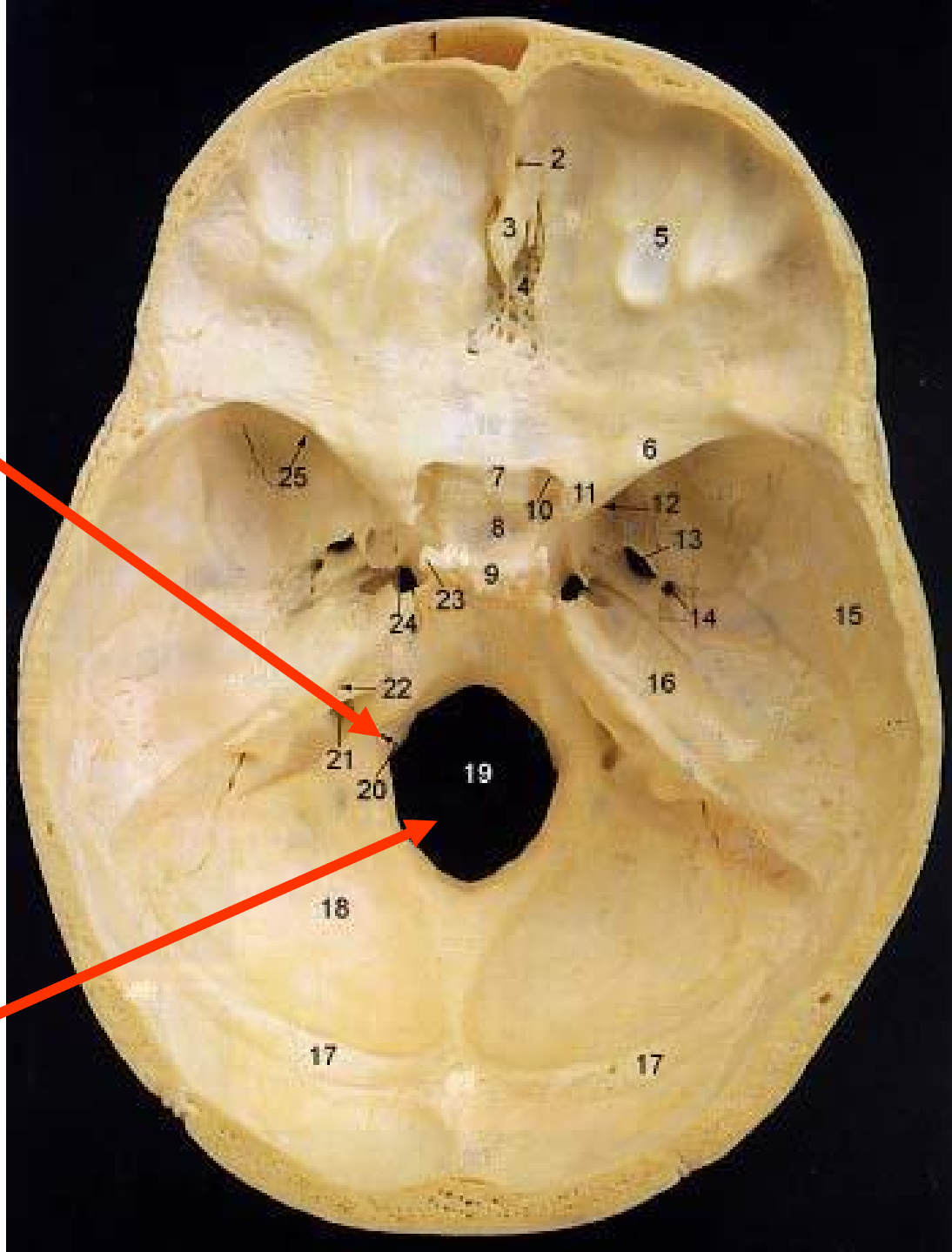



Carotid Canal
Jugular Foramen


Tympanic antrum
Tegmen tympani
Prominence of lateral semicircular canal
Prominence of facial canal
Fenestra vestibuli
Bristle in semicanal for Tensor tympani
Septum canalis musculotubarii
Bristle in hiatus of facial canal
Carotid canal
Bony part of auditory tube
Promontory
Bristle in pyramid
Fenestra cochleæ
Sulcus tympanicus
Bristle in stylomastoid foramen
Mastoid cells
Mastoid air cells

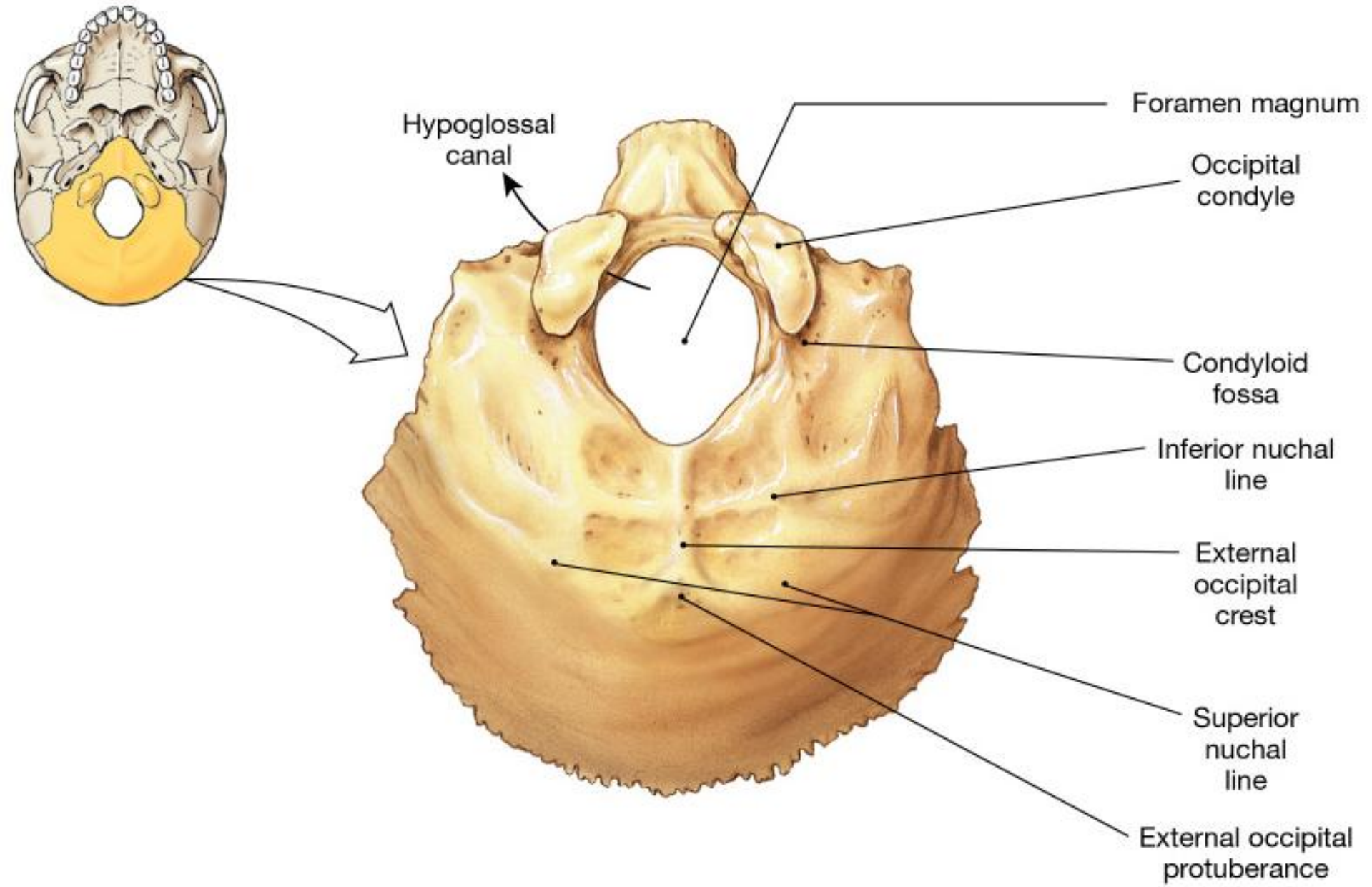
Hypoglossal canal

Foramen magnum

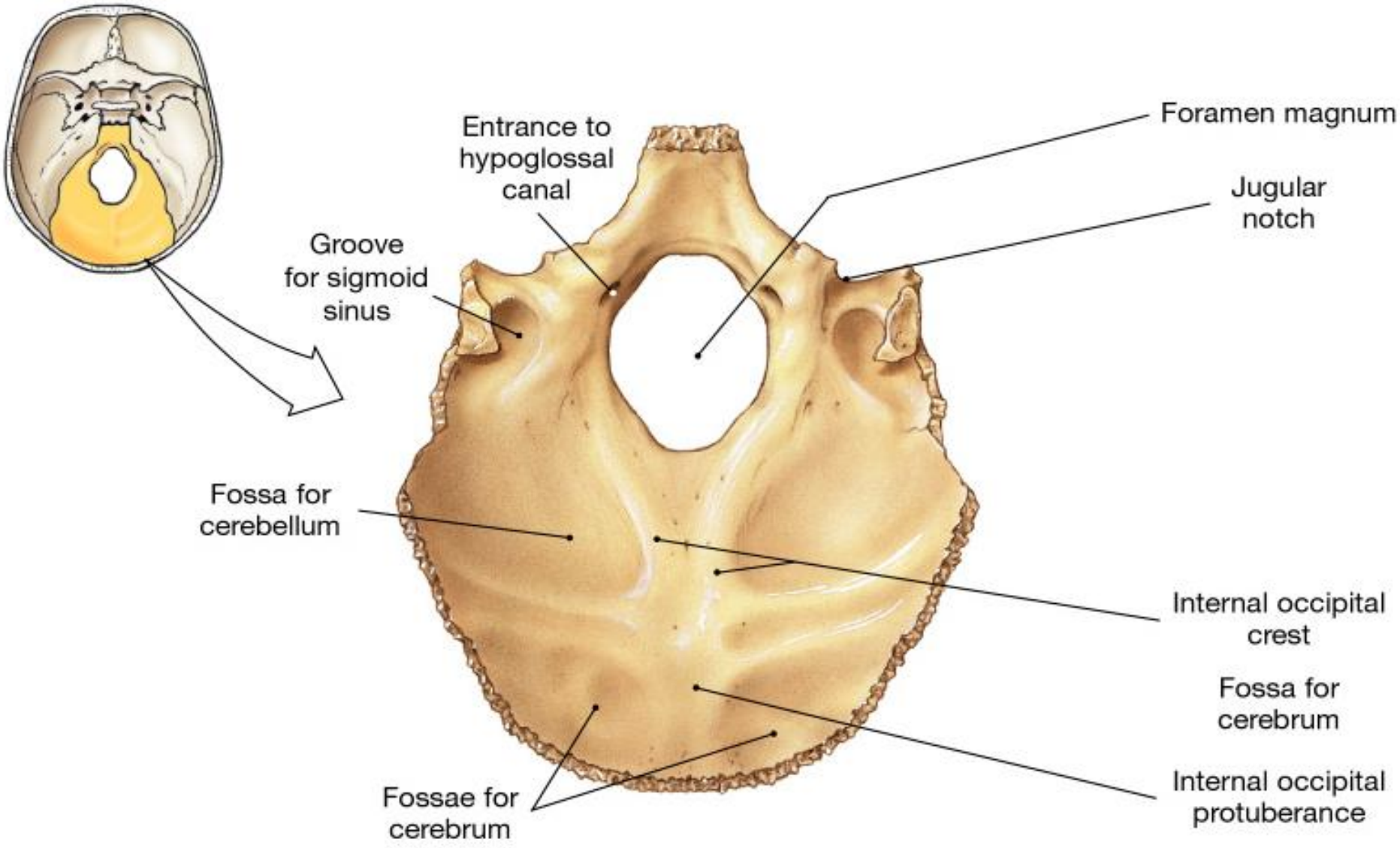


Occipital Bone

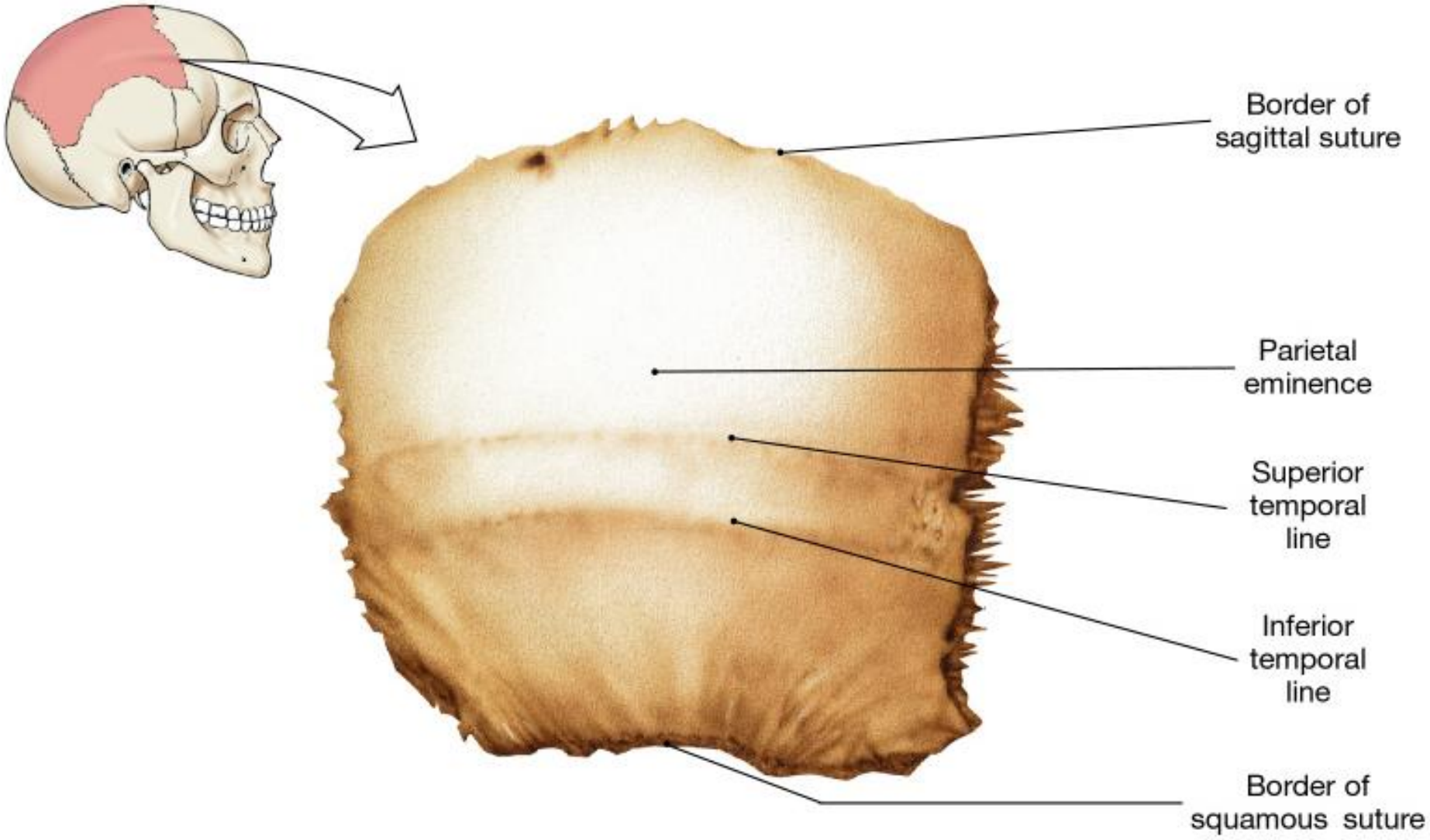
- Basilar part
  - **foramen magnum**
  - **occipital condyle**
  - **hypoglossal canal**
  - **Venous sinus grooves**
  - **external occipital protuberance-** attaches the **nuchal ligament** that binds the skull to the vertebral column
  - **Superior nuchal line-** identifies the superior part of the neck and provides attachment to the skull for several neck and back muscles.
  - **Inferior nuchal line-** provides attachment for the deep neck muscles



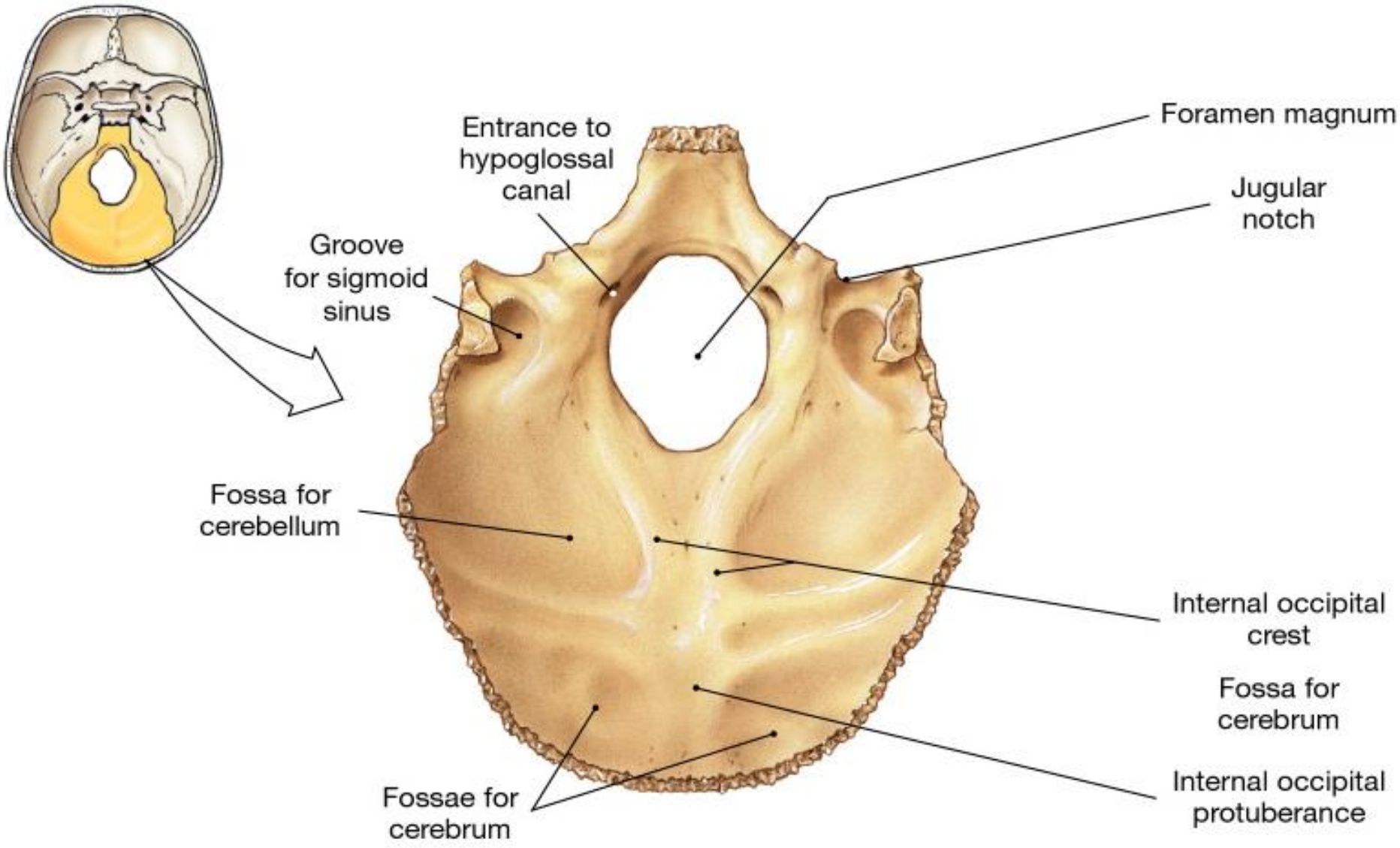
(a) Occipital bone, inferior (external) view



(b) Occipital bone, superior (internal) view

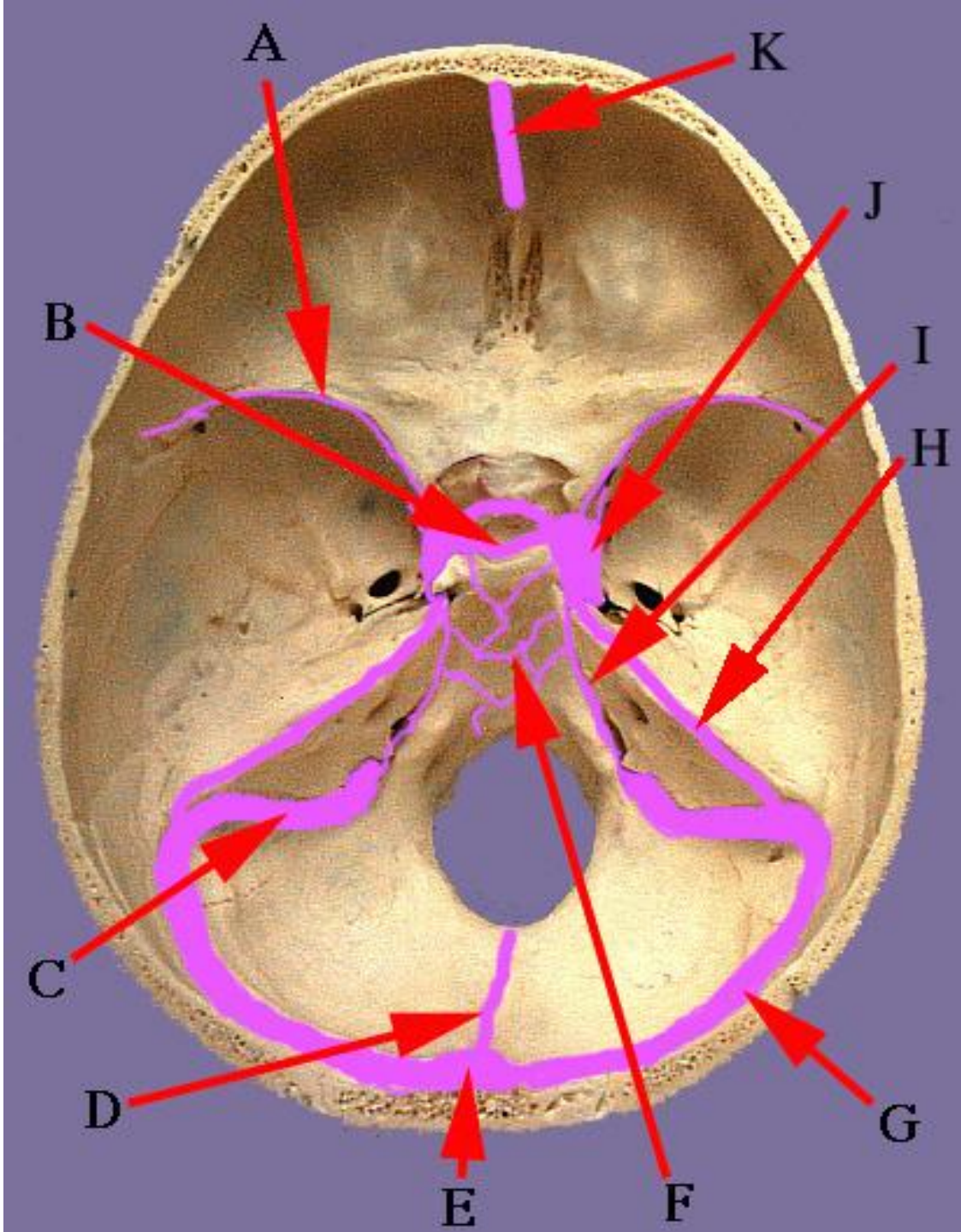


(c) Parietal bone, external surface

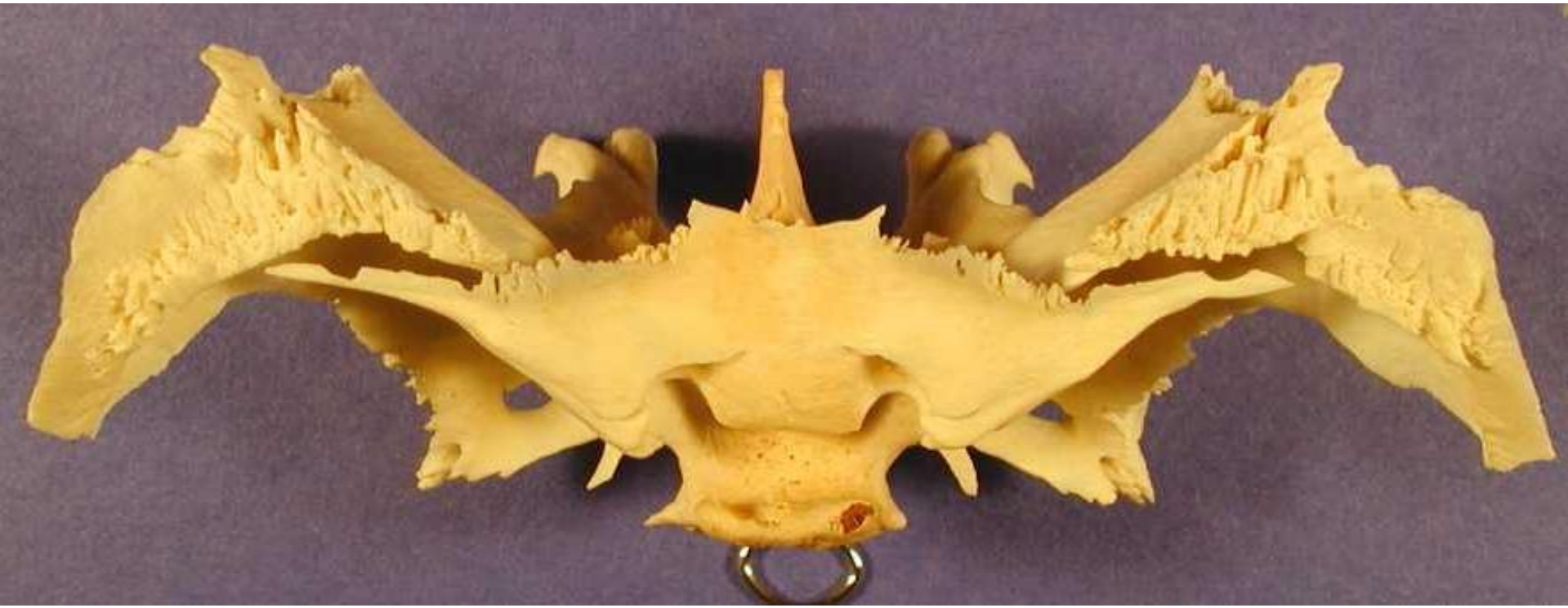


(b) Occipital bone, superior (internal) view

Venous sinus grooves



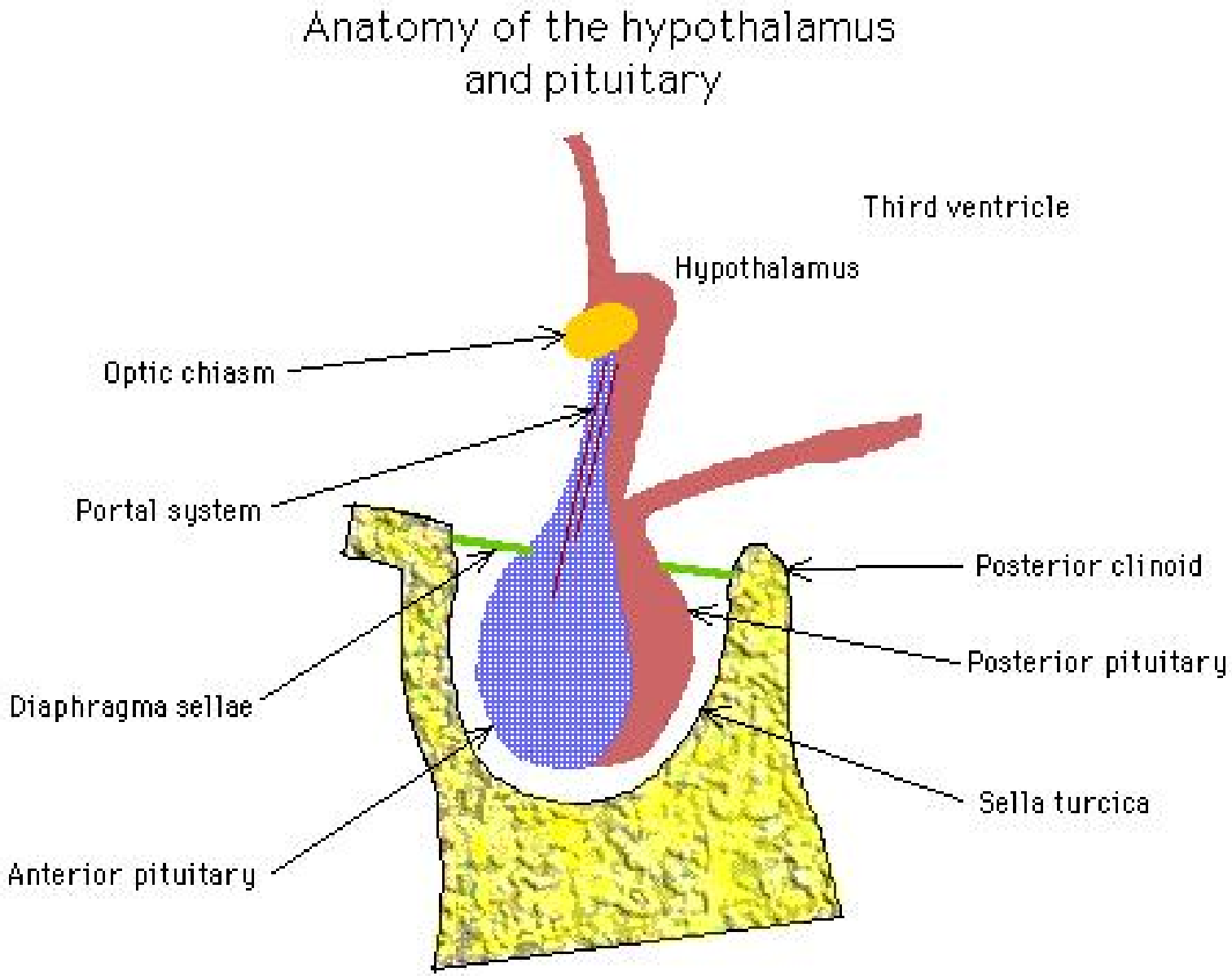
Sphenoid Bone



Sphenoid Bone

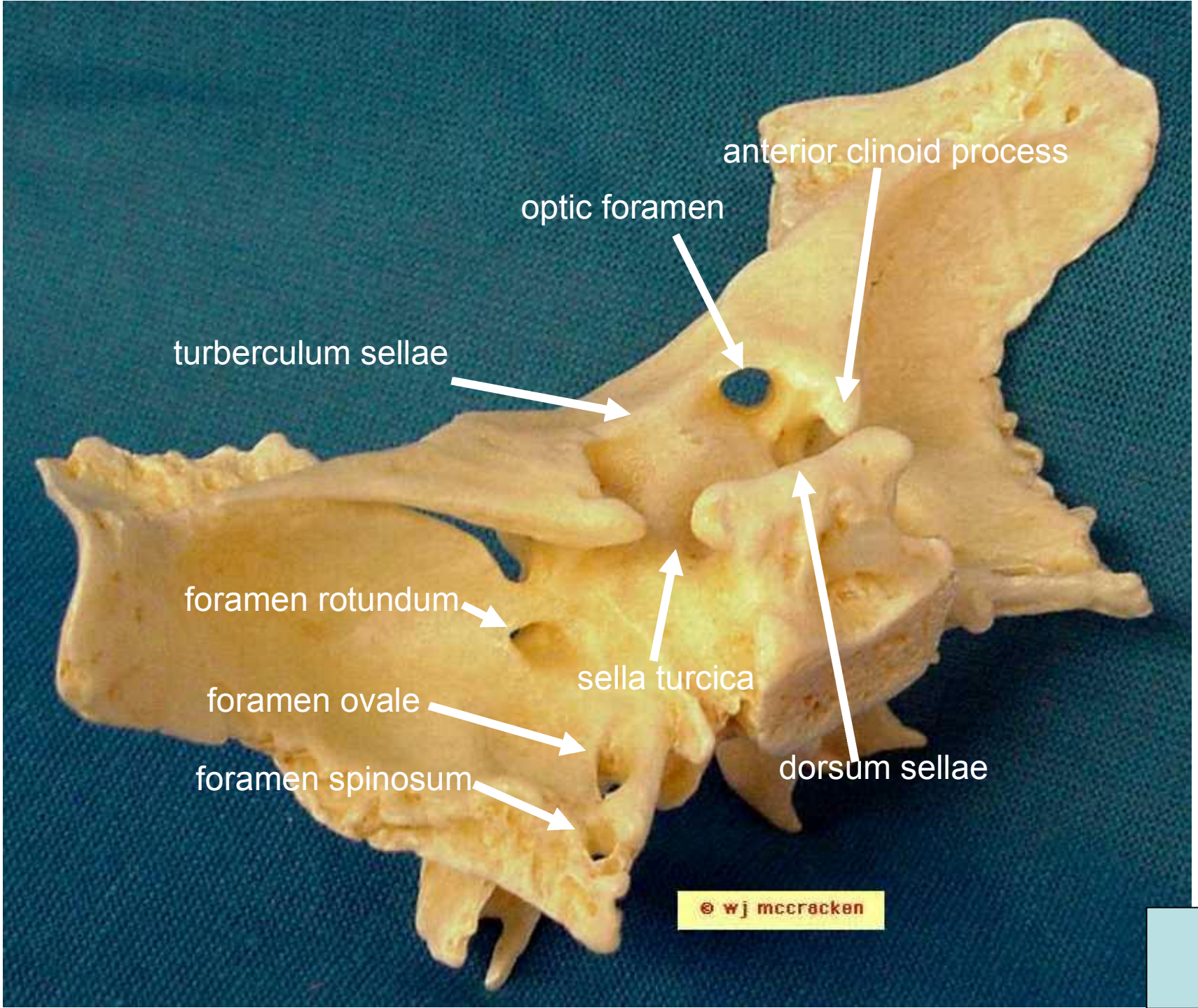
- **Lesser wing**
  - forms the posterior wall of the orbit
  - contains the optic foramen (optic nerve and ophthalmic artery)
  - anterior clinoid process- guard the optic foramen
  - superior orbital fissure- nerves for muscles of eye movement
- **Body**
  - sella turcica
    - has deep pit that called the hypophyseal fossa which houses the pituitary gland
    - turberculum sellae- anterior raised margin
    - dorsum sellae- posterior margin
    - covered by fibrous membrane and has a stalk that penetrates the membrane and that connects the pituitary to the hypothalamus

Sella turcica



Sphenoid Bone

- **Greater wing**
  - **foramen rotundum-** branch of trigeminal
  - **foramen ovale-** branch of trigeminal
  - **foramen spinosum-** artery to the meninges
  - **foramen lacerum-** filled with cartilage, no vessels are nerves transmitted
  - **Pterygoid plates** (medial and lateral)- provide attachment for jaw muscles
- **Sphenoid sinuses**


anterior clinoid process
optic foramen
turberculum sellae
foramen rotundum
sella turcica
foramen ovale
foramen spinosum
dorsum sellae
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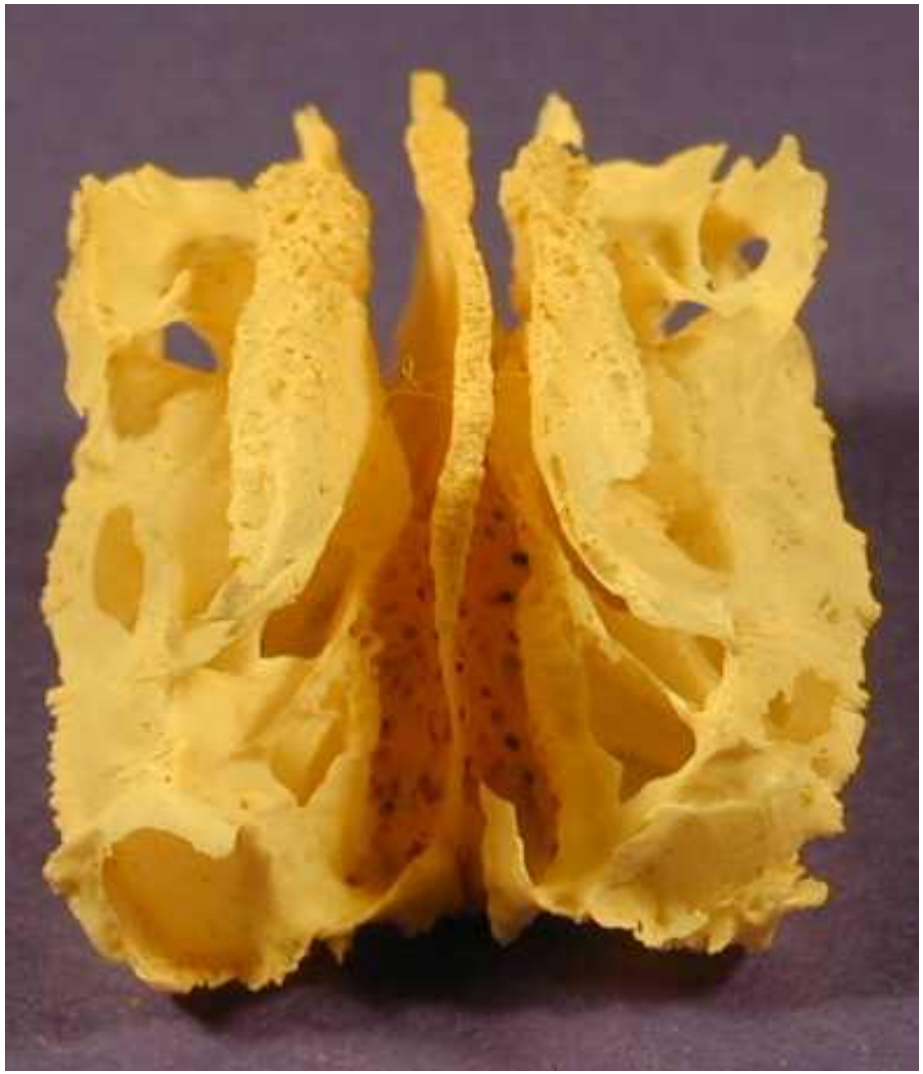
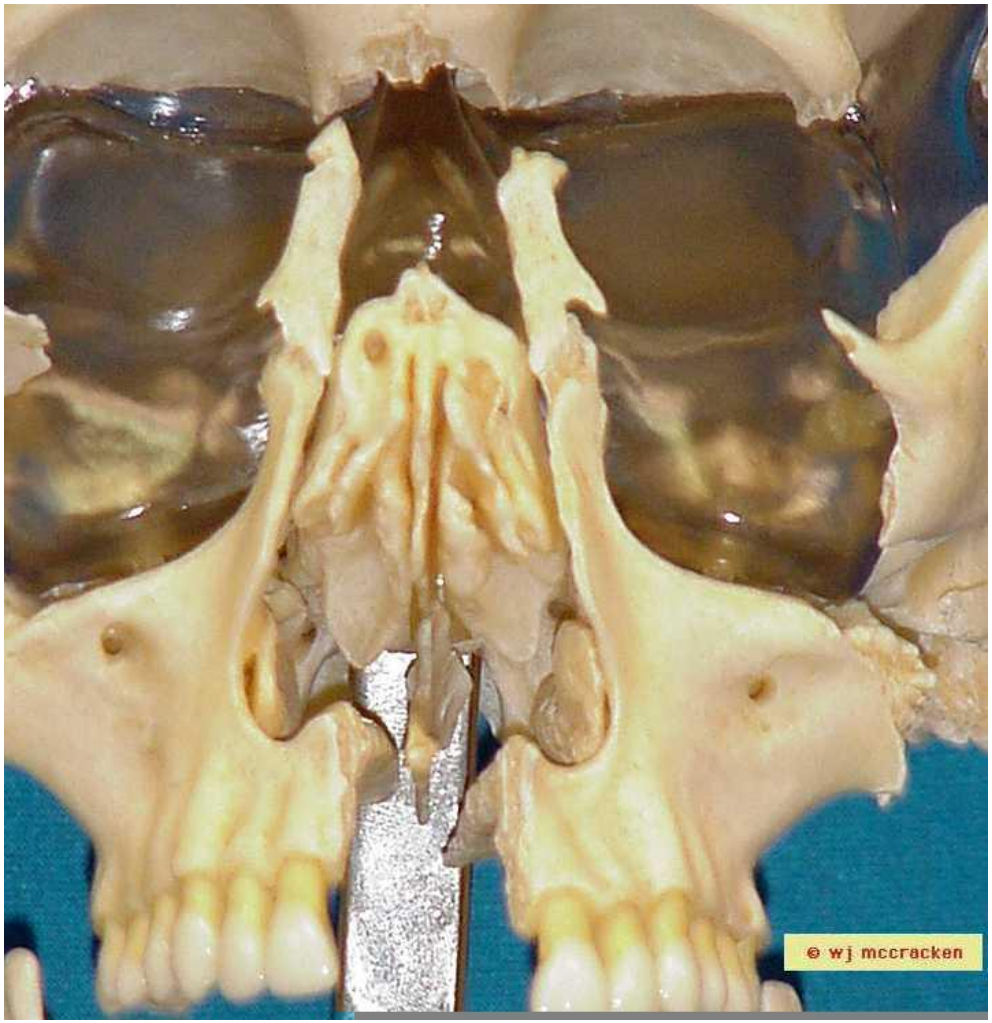
Ethmoid Bone

Ethmoid Bone



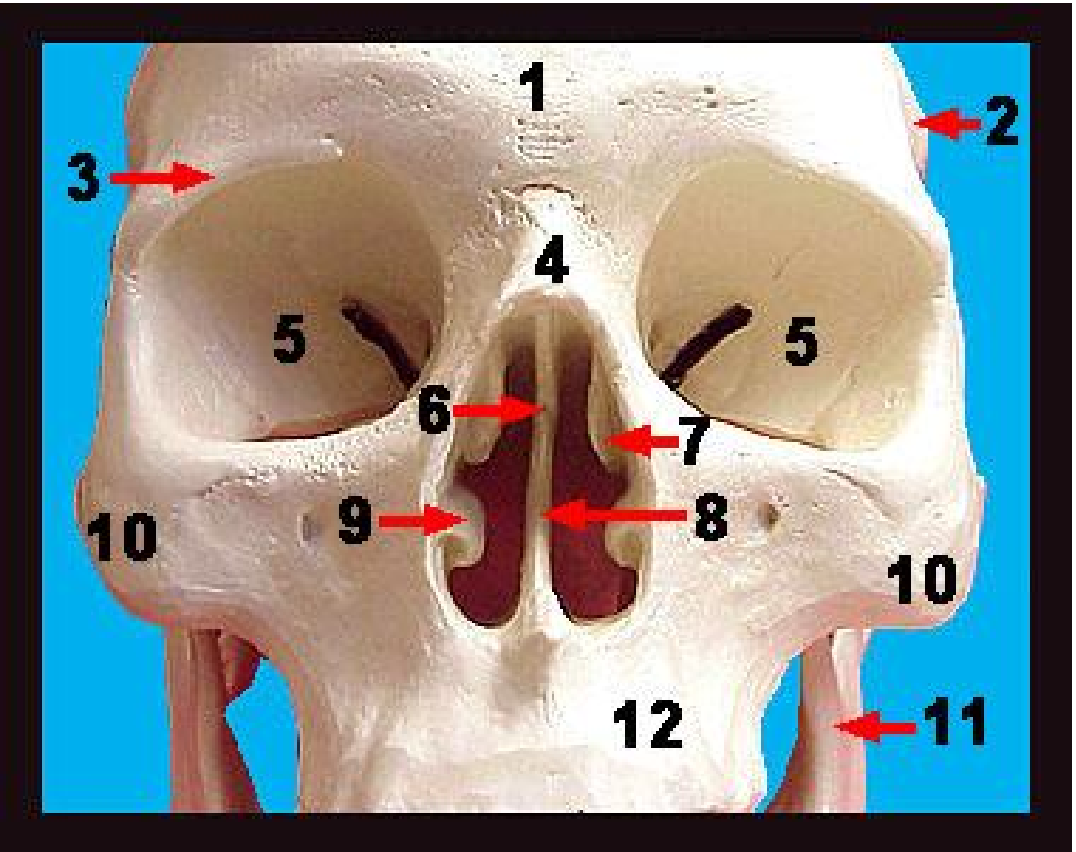
Ethmoid Bone

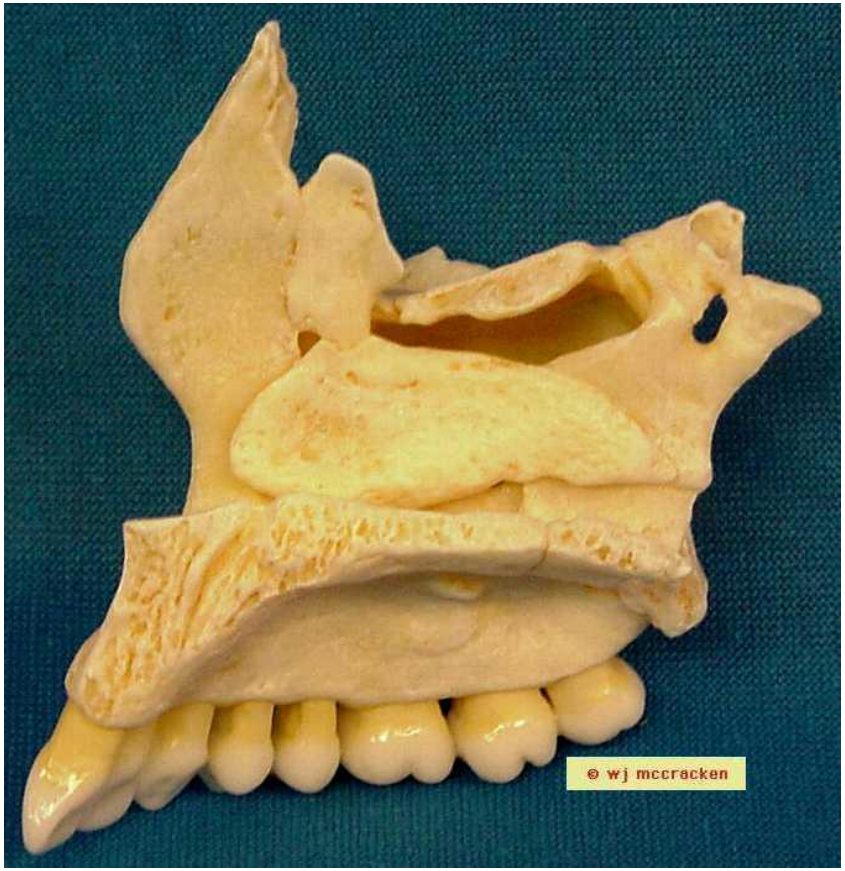
- located between the orbital cavities and forms the roof of the nasal cavity
- **perpendicular plate-** inferior projection that divides the nasal cavity into right and left nasal fossae
- **nasal conchae** (turbinate bones)- superior and middle project into the nasal cavity
  - are covered with the mucous membrane
  - superior conchae contain receptors for the sense of smell



Ethmoid Bone

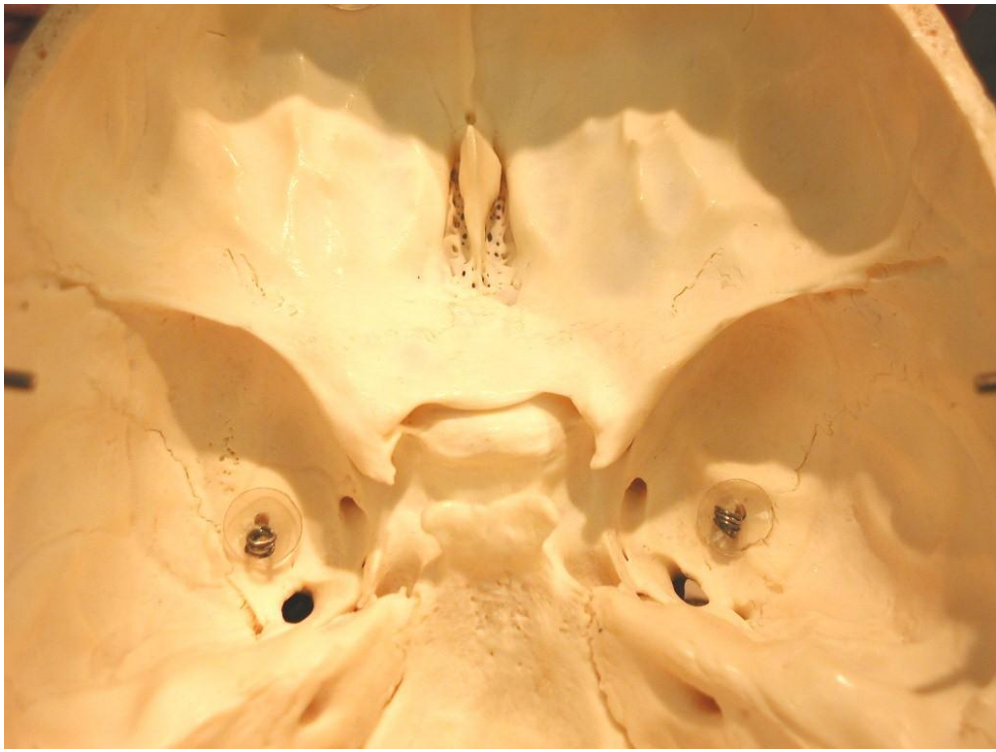
- **Inferior nasal conchae** is a separate bone extending into the nasal cavity





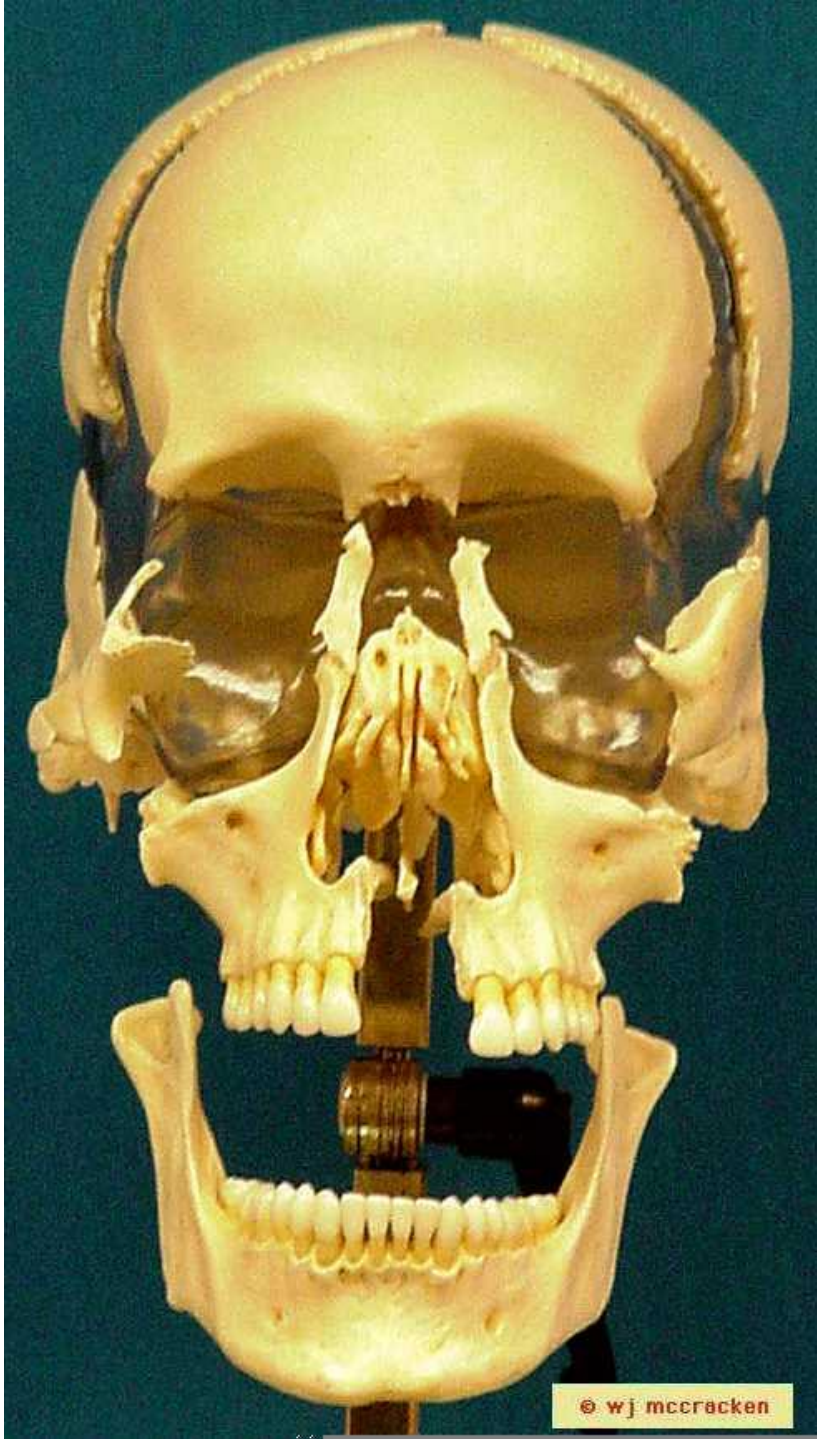
Ethmoid Bone

- Crista galli- midsaggital crest that serves as an attachment for meninges
- Cribriform plate- horizontal shelf with numerous perforations that allow nerve fibers for smell to pass from the nasal cavity to the brain

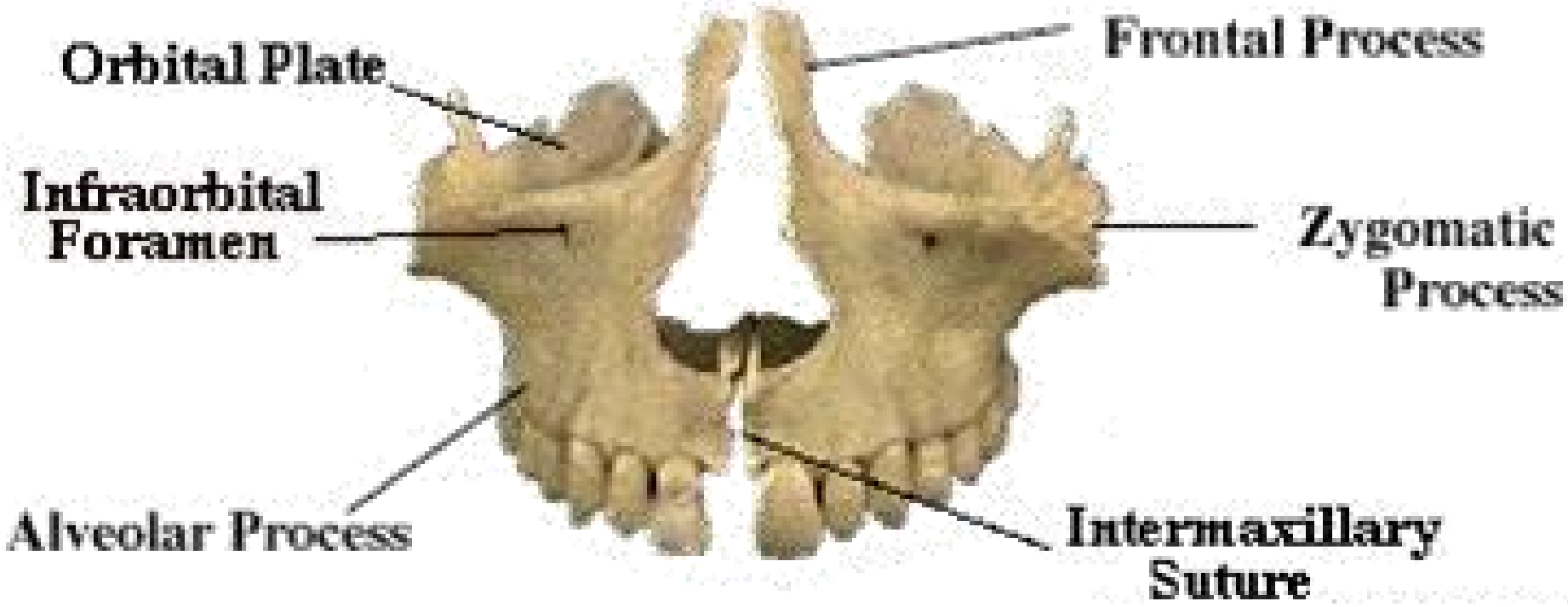


Facial Bones

- bones that have no direct contact with the brain or meninges
- total of 14 bones
  - 2 maxillae
  - 2 palatine bones
  - 2 zygomatic bones
  - 2 lacrimal bones
  - 2 nasal bones
  - 2 inferior nasal conchae
  - 1 vomer
  - 1 mandible



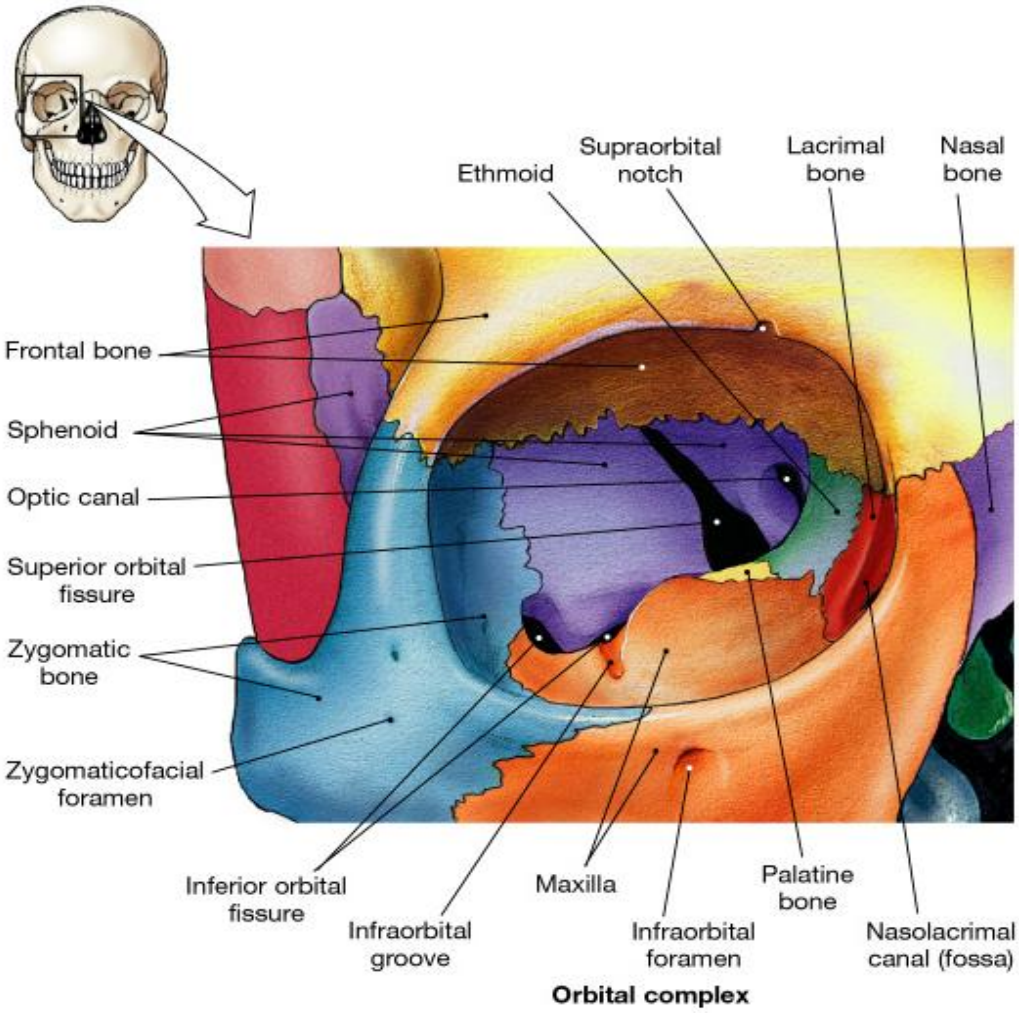
Maxillae

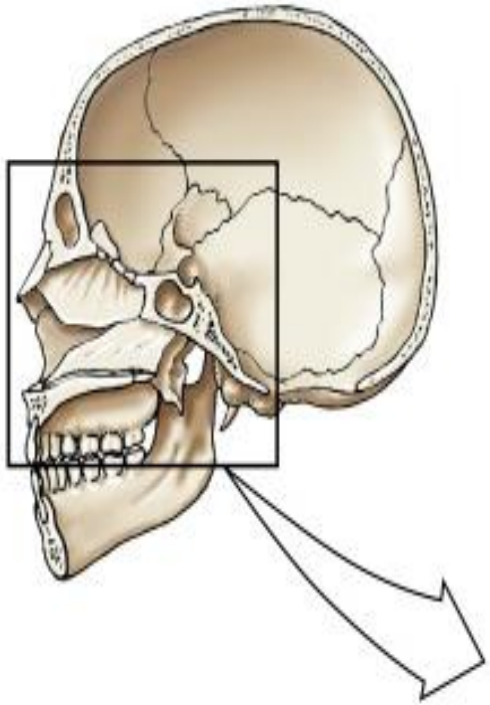


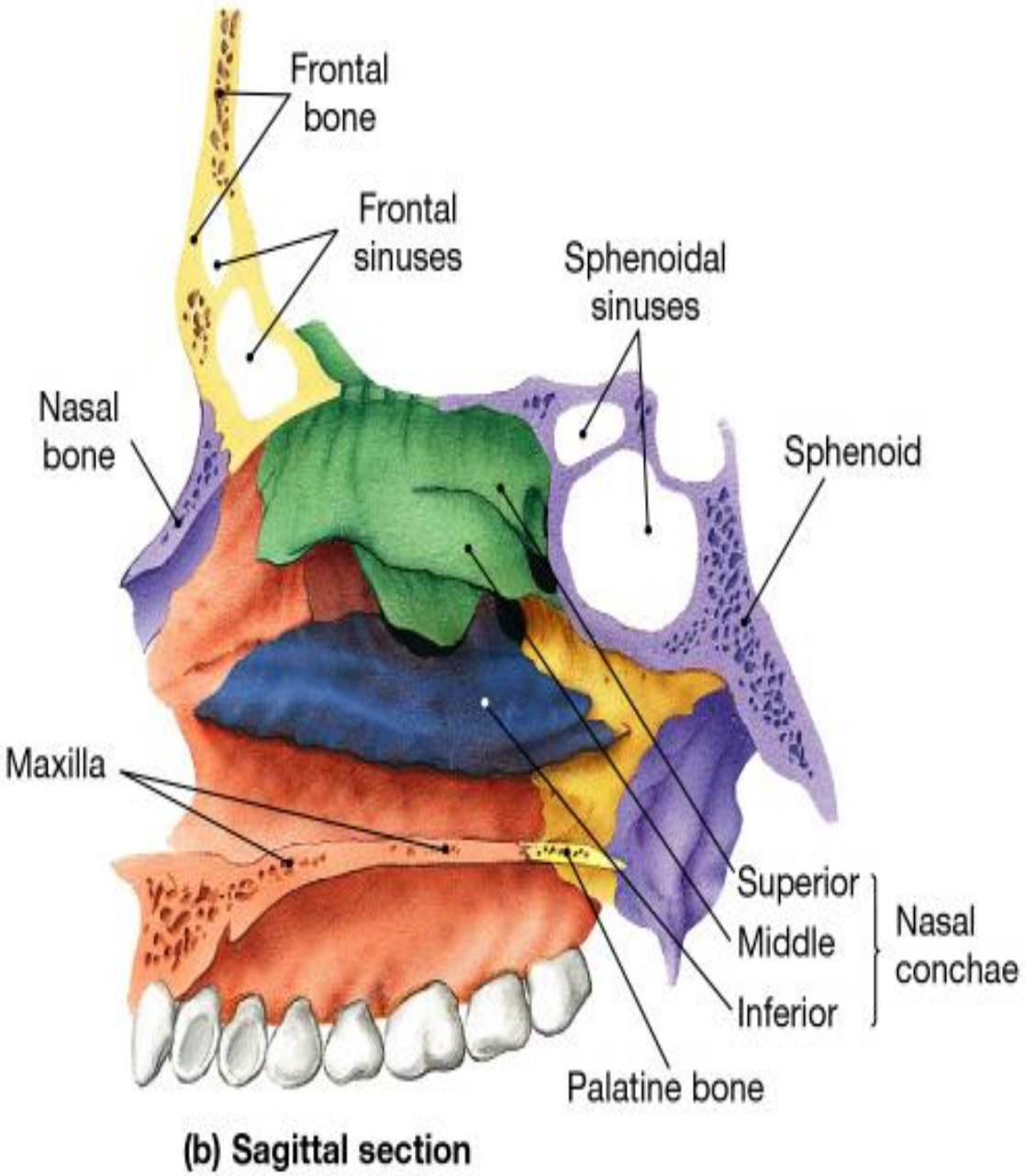
- Upper jaw
- **alveolar process-** points of maxillary bone that project between spaces of the teeth
- **alveolus**- teeth sockets
- **infraorbital foramen-** receives sensations from the nasal and and cheek that emerges through the foramen rotundum into the cranial cavity

Maxillae

- forms part of the orbit where it exhibits a gash called the **inferior orbital fissure**
  - provides passage for blood vessels and nerves of eye muscles



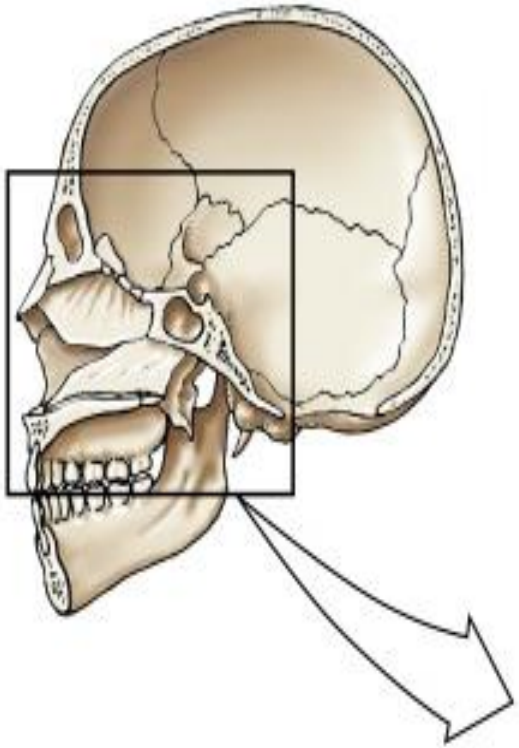


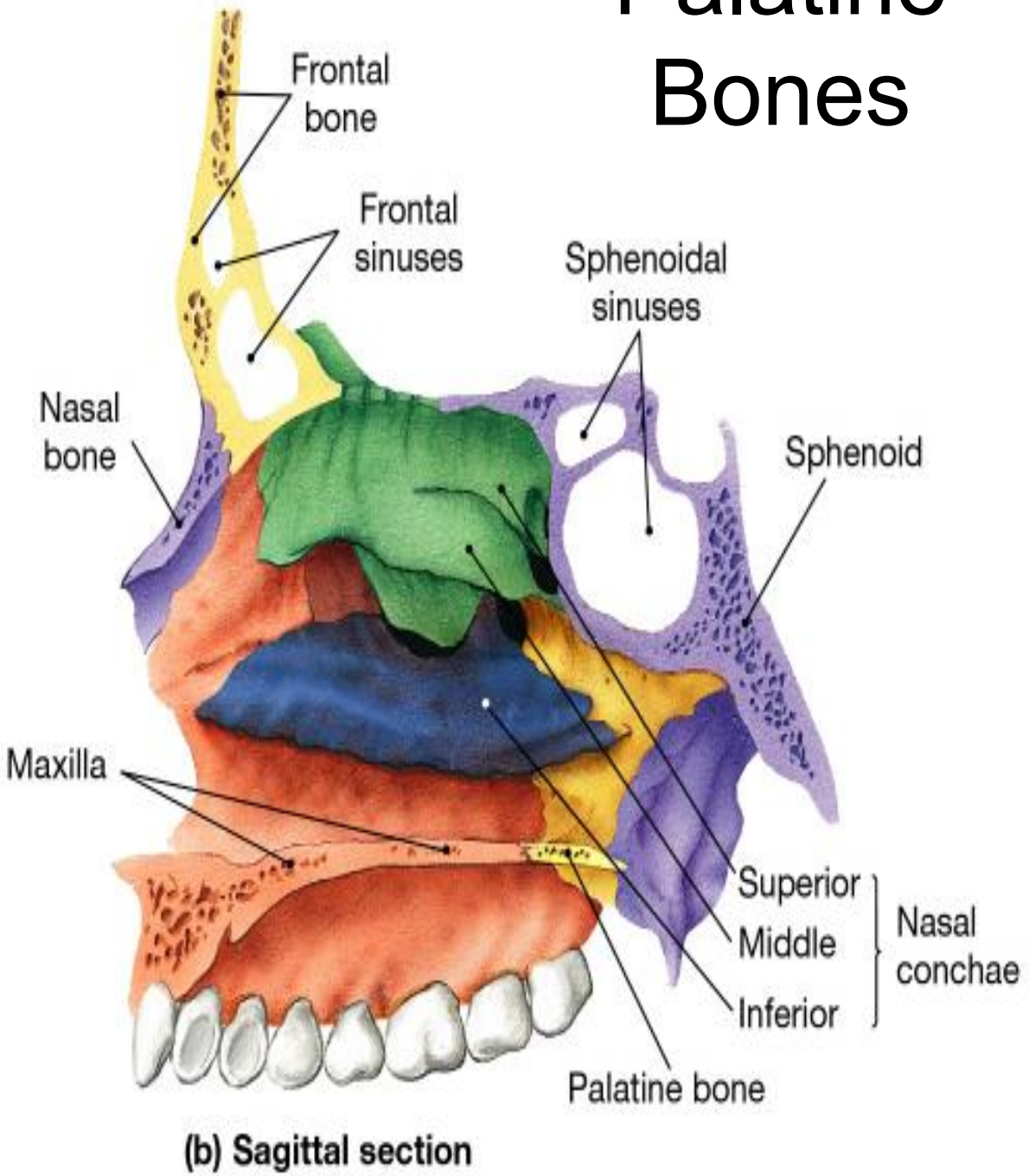


(b) Sagittal section

- **palatine process-** forms the anterior roof of mouth (hard palate) and floor of nasal cavity

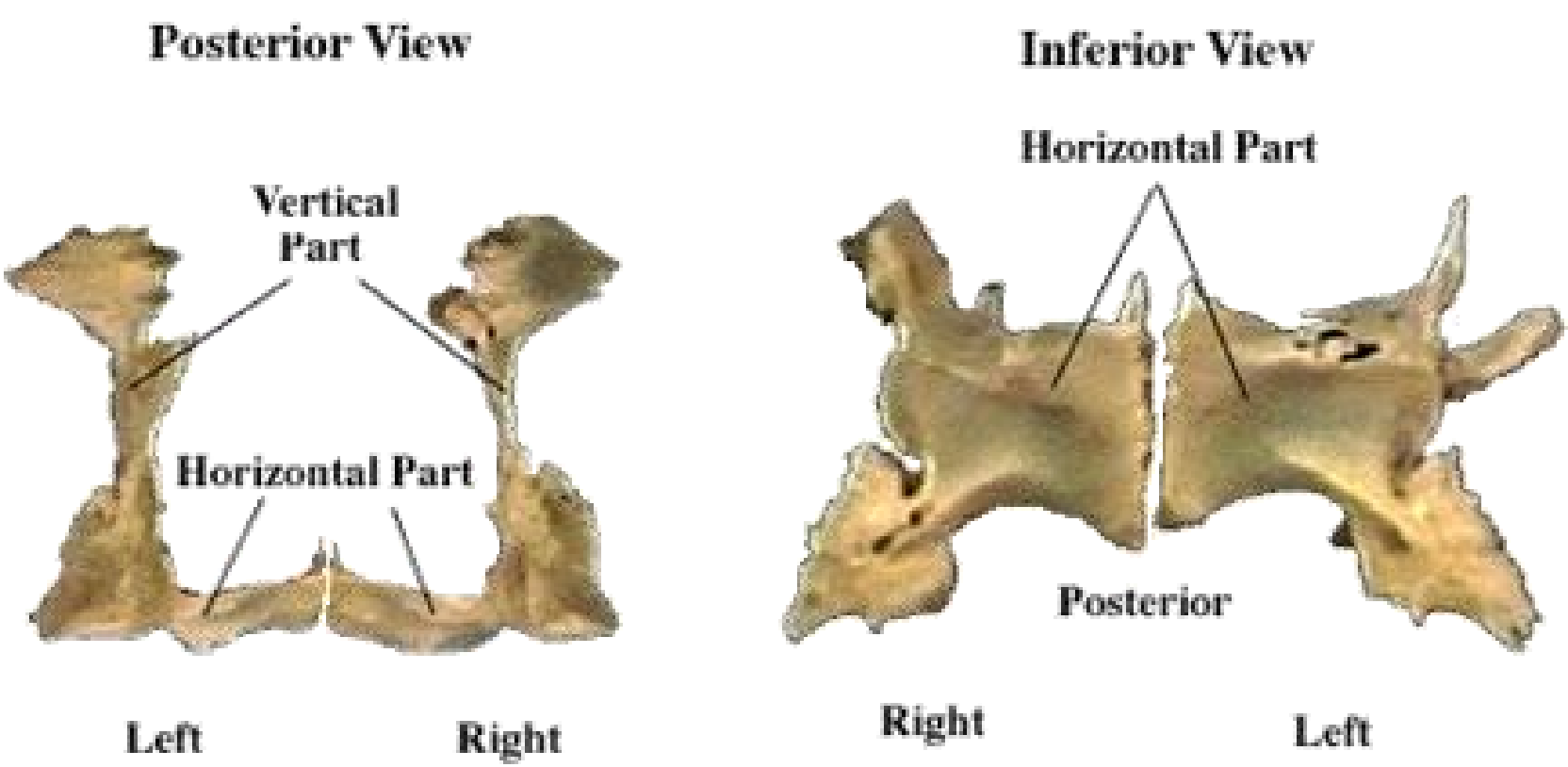
Palatine Bones





(b) Sagittal section

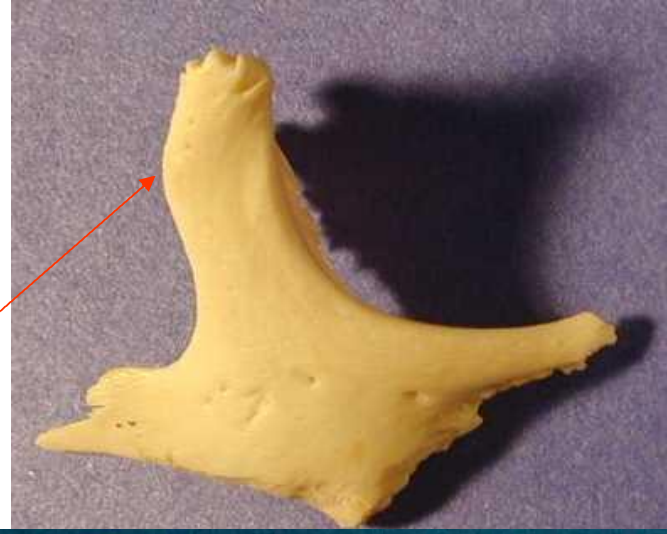
- forms the posterior hard palate, part of the floor of the orbit, and part of the wall of the nasal cavity



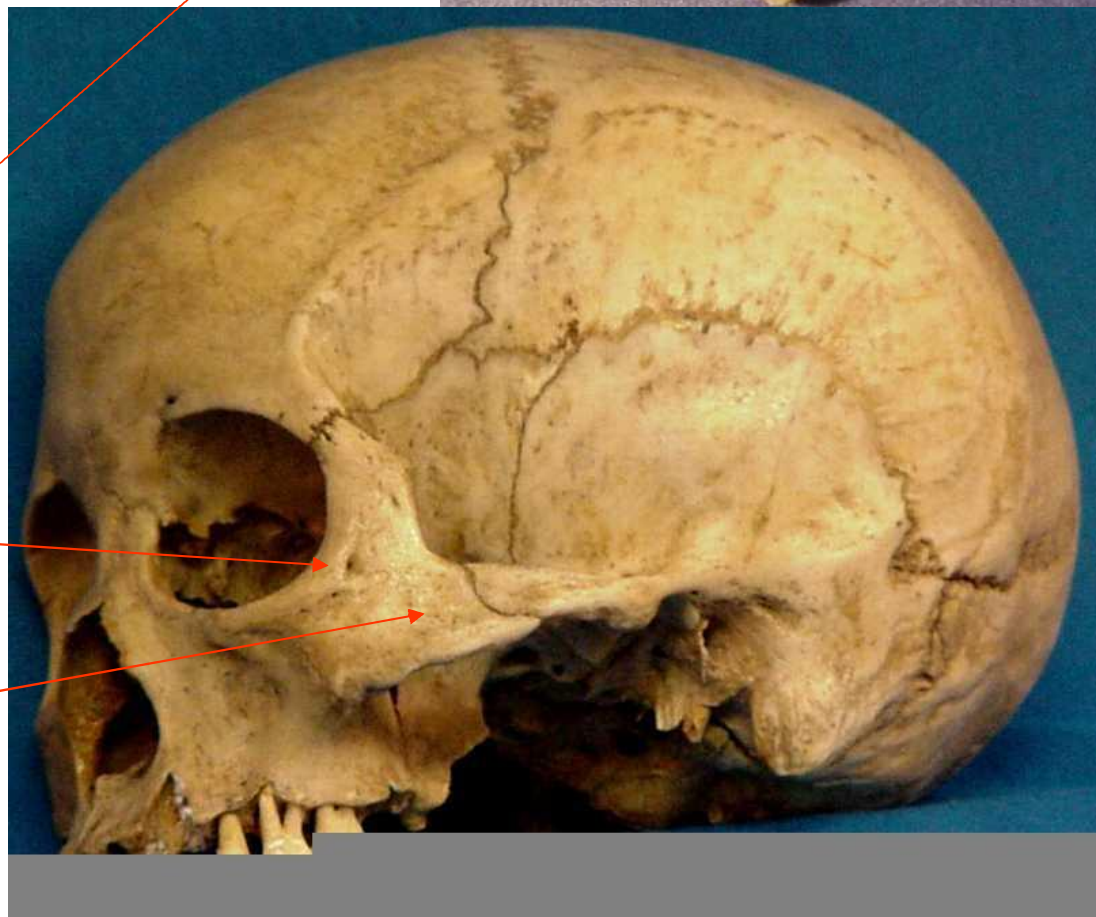
Palatine Bone

Forms part of the floor of the orbit and hard palate

Zygomatic Bone



- forms the angle of the cheeks
- **frontal process-** part of the lateral wall of the orbit
- zygomaticofacial foramen
- Temporal process



Lacrimal Bone

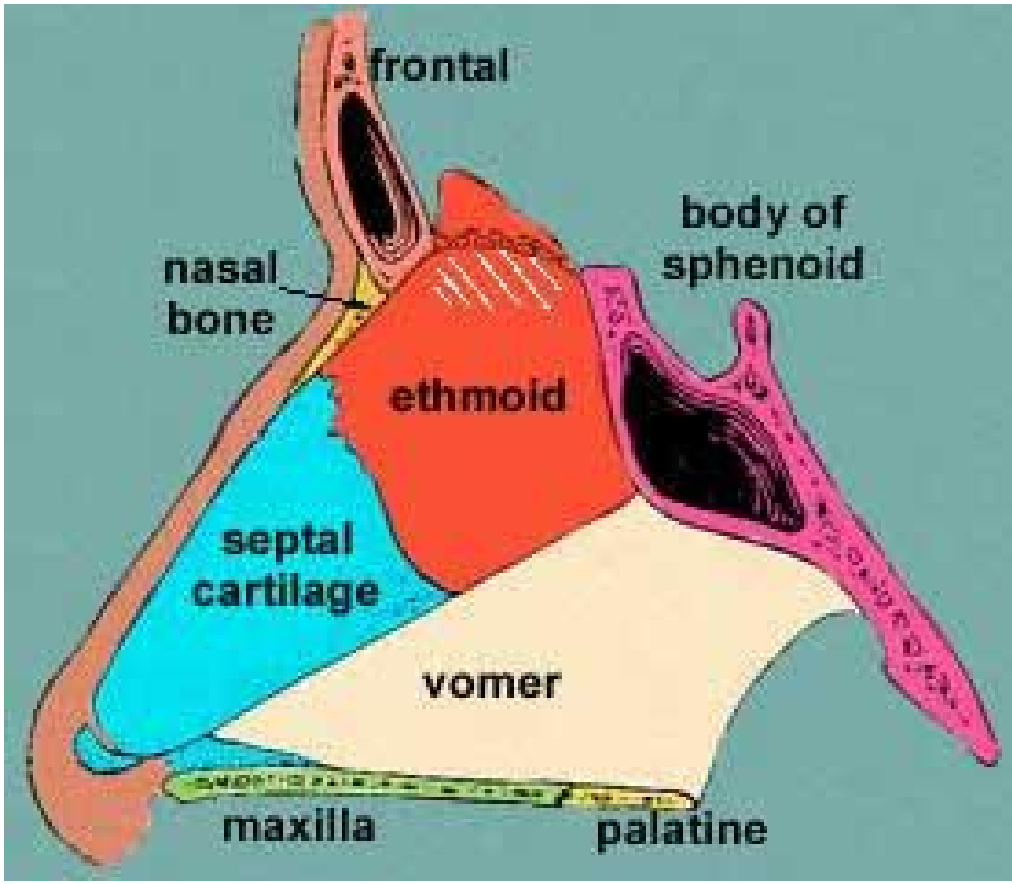
- part of the medial wall of the orbit
- **lacrimal fossa-** houses the **lacrimal sac**
  - tears from the membranous sac drain into the nasal cavity

Vomer

- forms the anterior half of the nasal septum

Nasal Septum

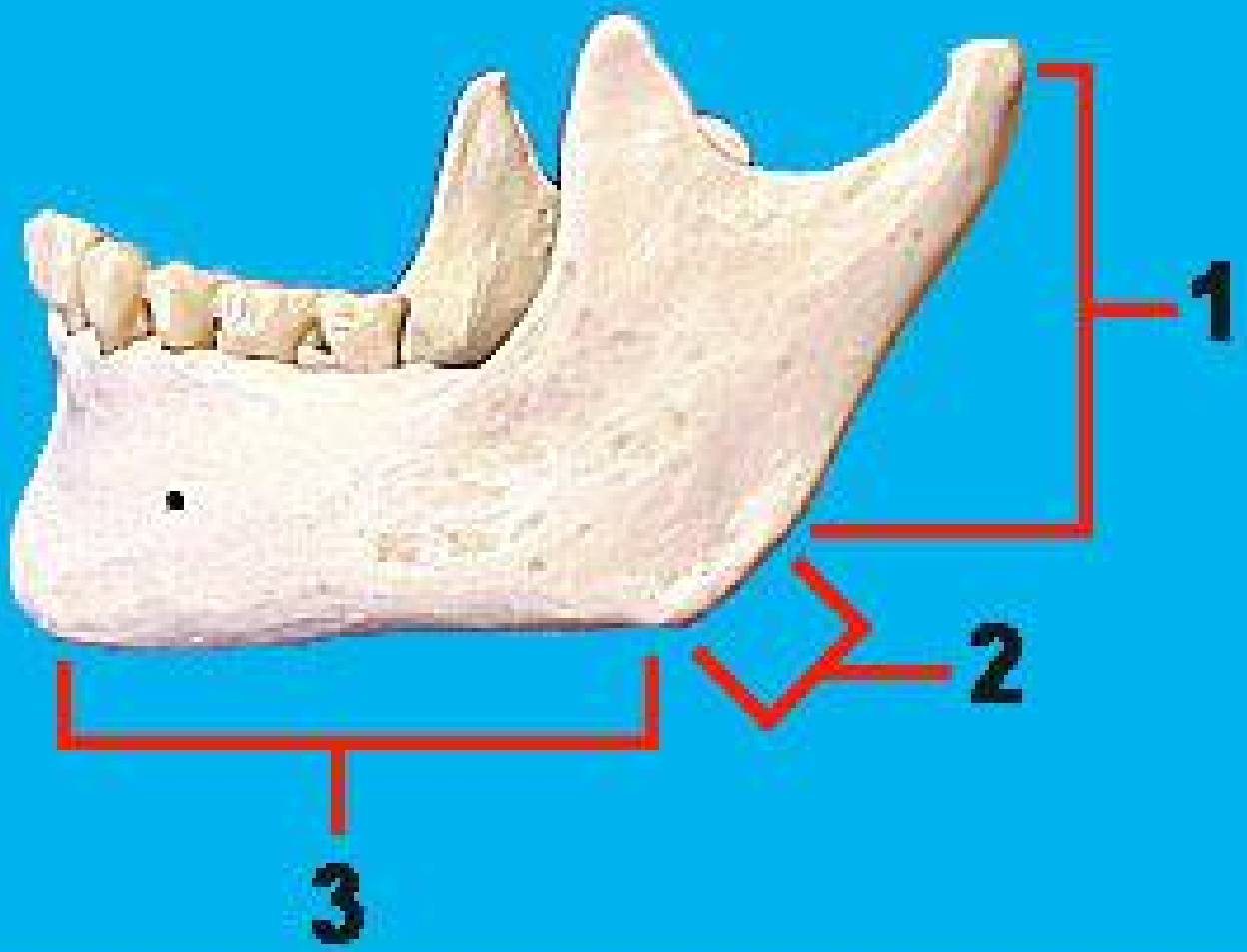
- Consist of
  - perpendicular plate of the ethmoid bone
  - Vomer
  - Septal cartilage

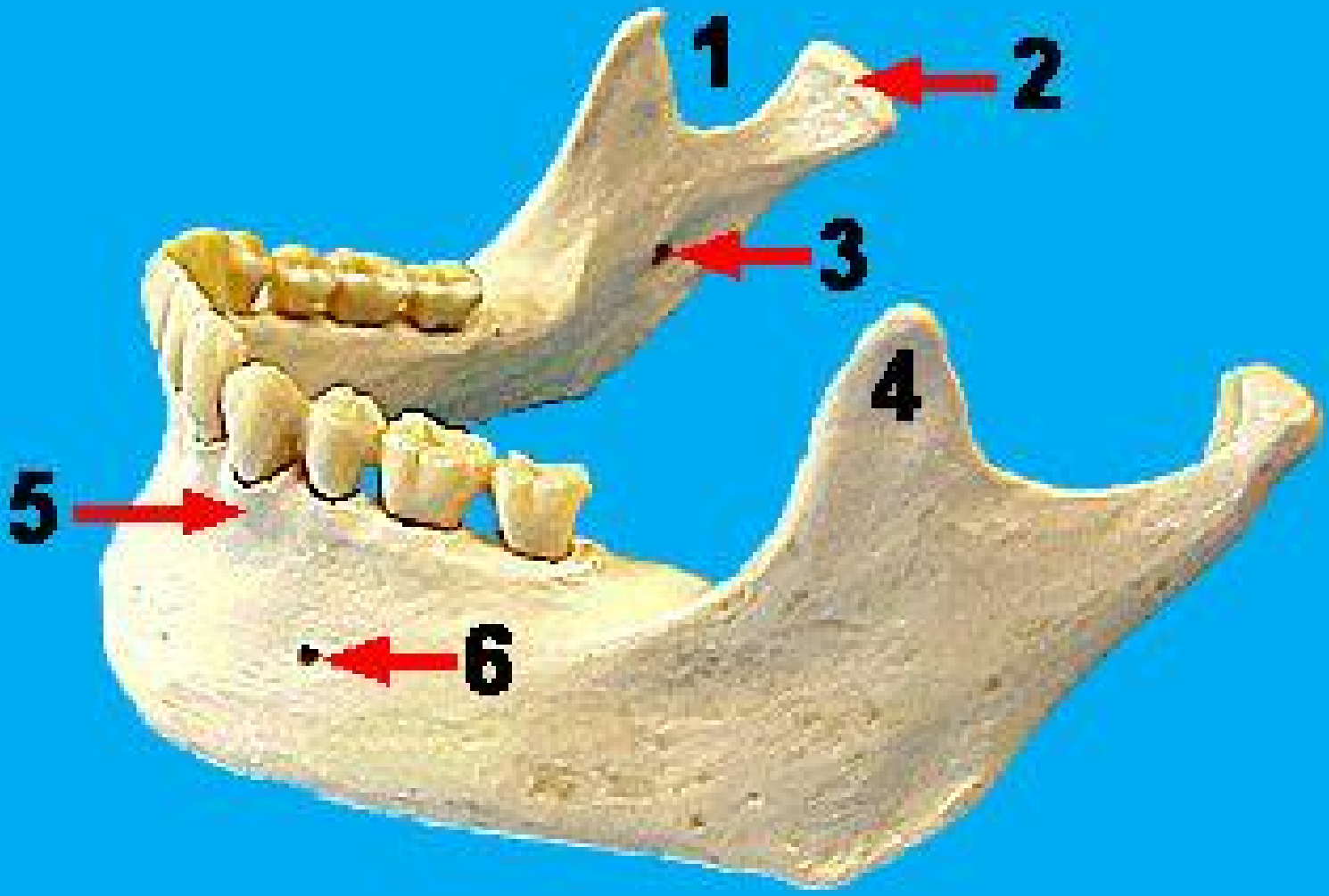


Mandible

- strongest bone of the skull and the only one that can move
- supports teeth and provides attachment for the muscles of mastication and facial expression
- **mental foramen-** passage of blood vessels and nerves of the chin
- **mandibular foramen-** nerve and blood vessel that supplies the lower teeth
- **condyloid process**
- **mandibular condyle**
- **coronoid process**
- **temporomandibular joint (TMJ)**

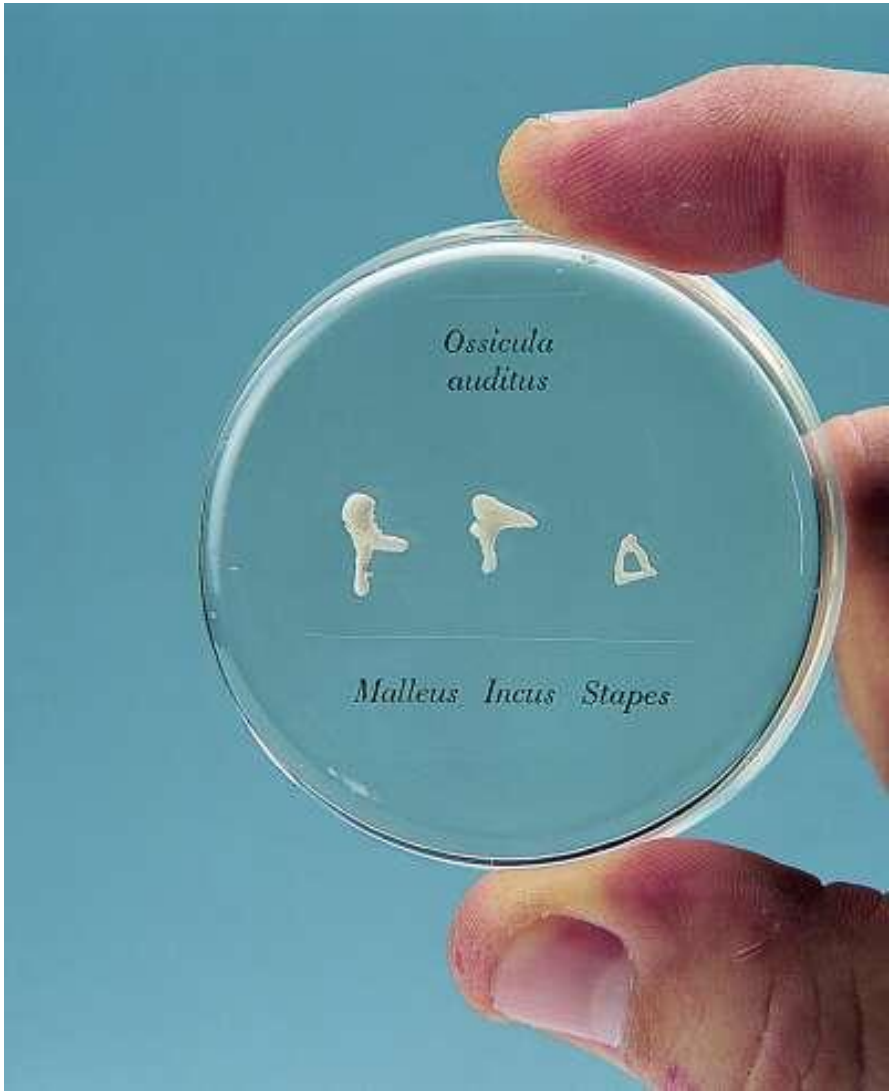
1. Ramus of the mandible 2. Mandibular angle 3. Body of the mandible

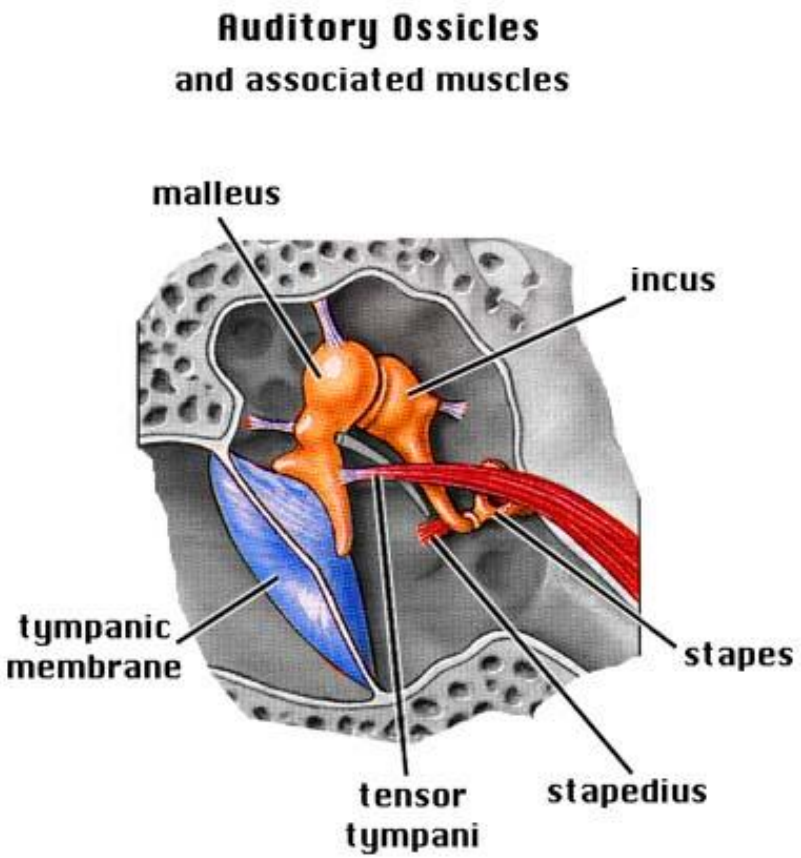




1. Mandibular notch 2. Mandibular condyle 3. Mandibular foramen 4. Coronoid process 5. Alveolar margin 6. Mental foramen

Auditory Ossicles

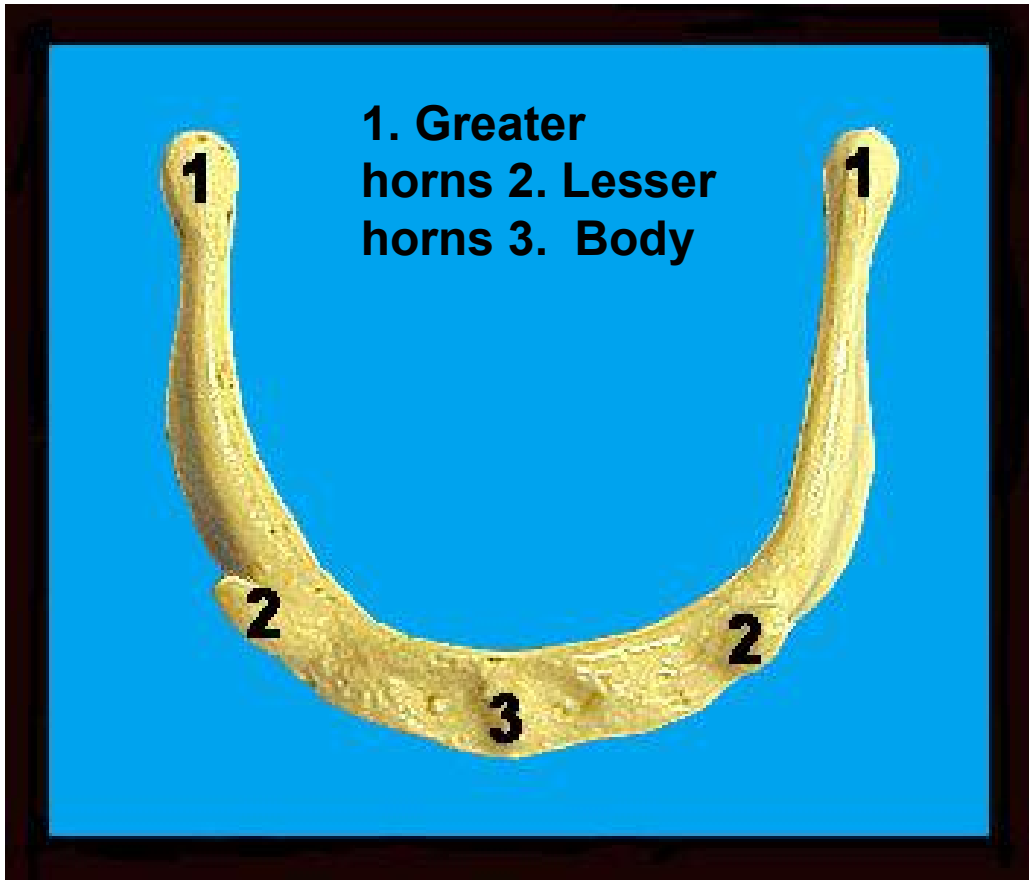


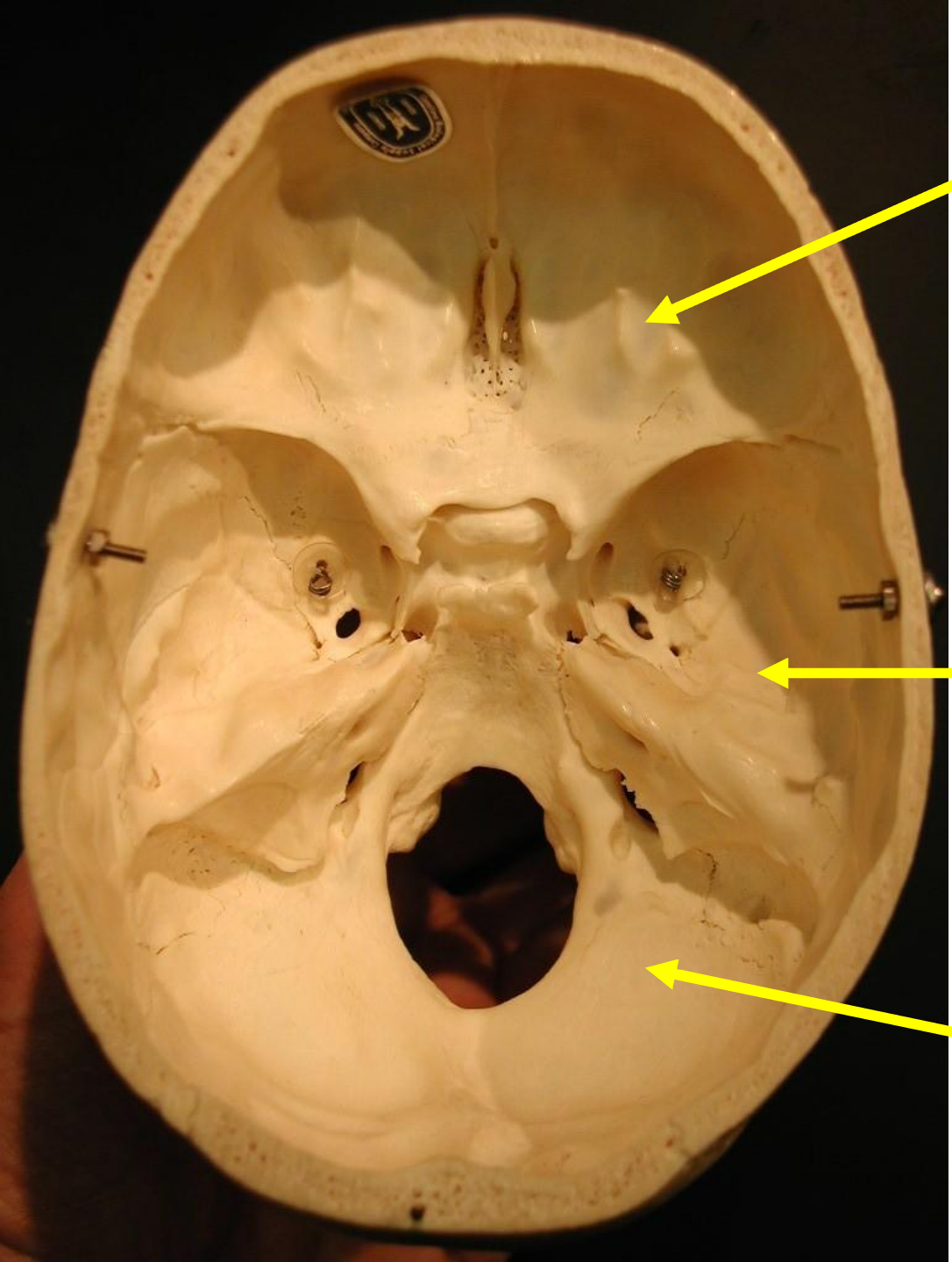


Modified from Fig. 18-10, Prentice Hall, Martini/Timmons 1997

Hyoid Bone

- does not articulate with any other bone
- suspended from the styloid process of the skull by the small stylohyoid muscle and stylohyoid ligament
- serves as attachment of several muscles that control the mandible, tongue, and larynx
- fractured hyoid bone can be used as evidence of strangulation

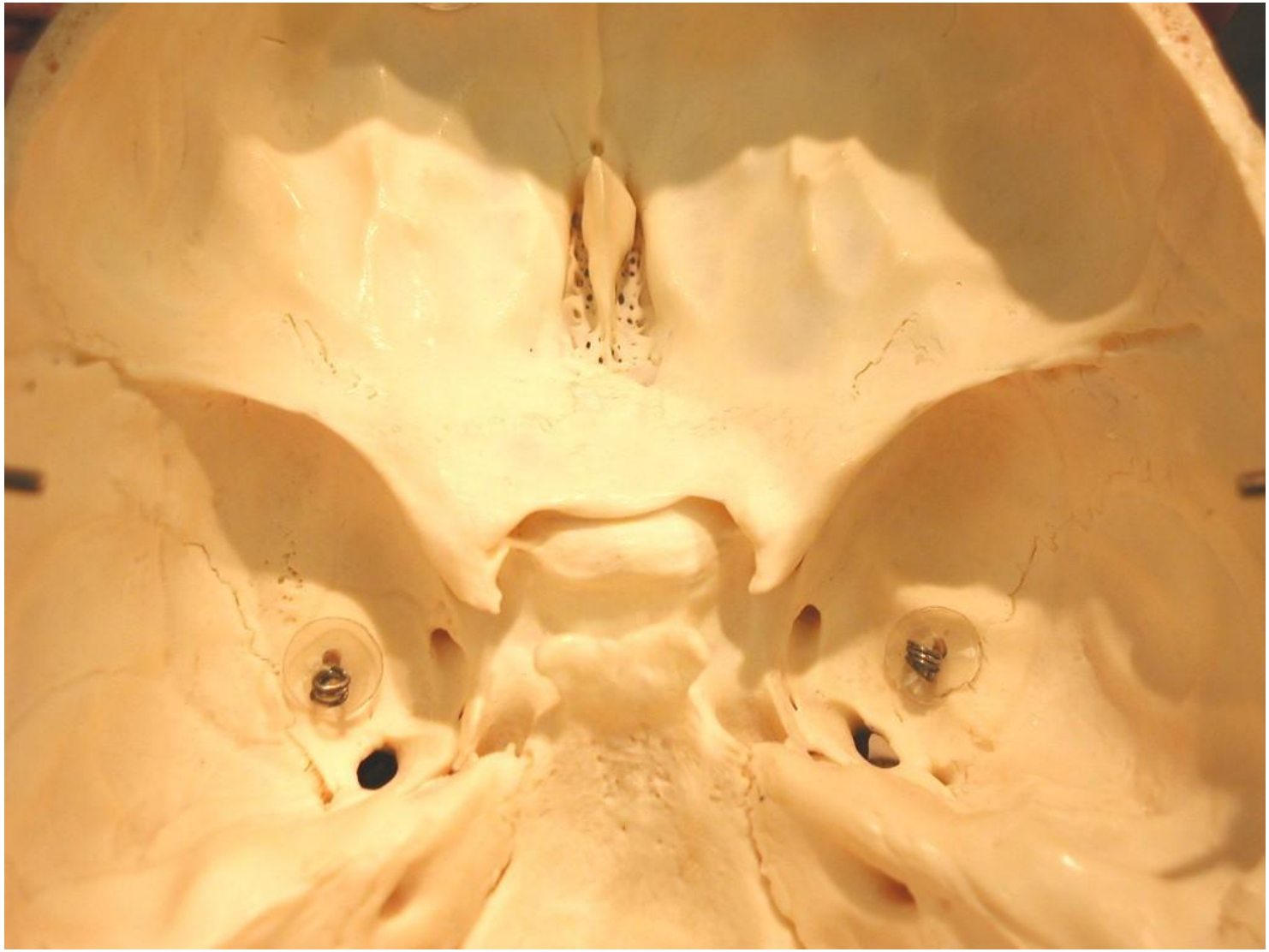


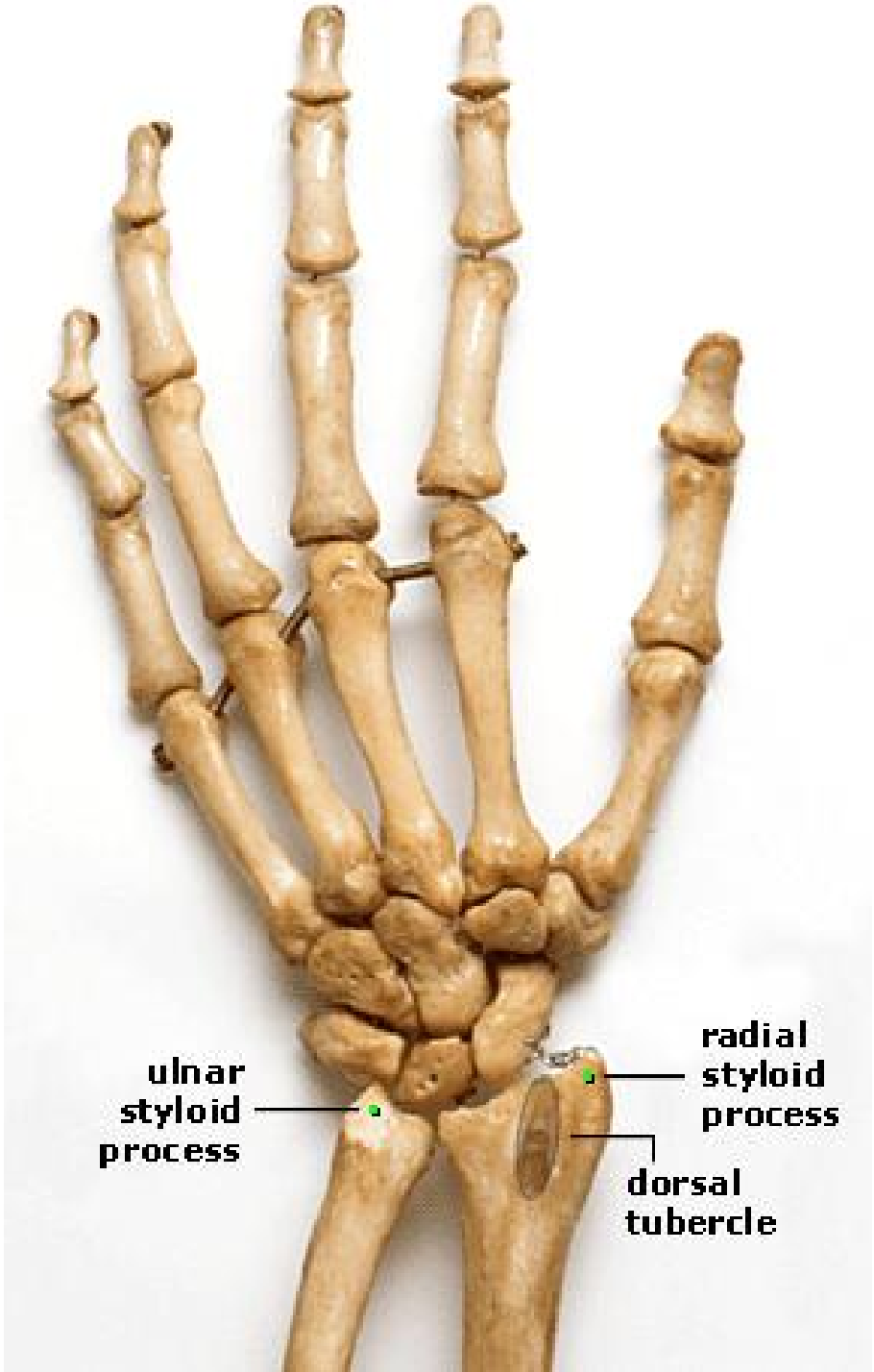


Anterior Cranial Fossa
Frontal Lobe

Middle Cranial Fossa
Temporal Lobe

Posterior Cranial Fossa
Cerebellum




ulnar
styloid
process
radial
styloid
process
dorsal
tubercle

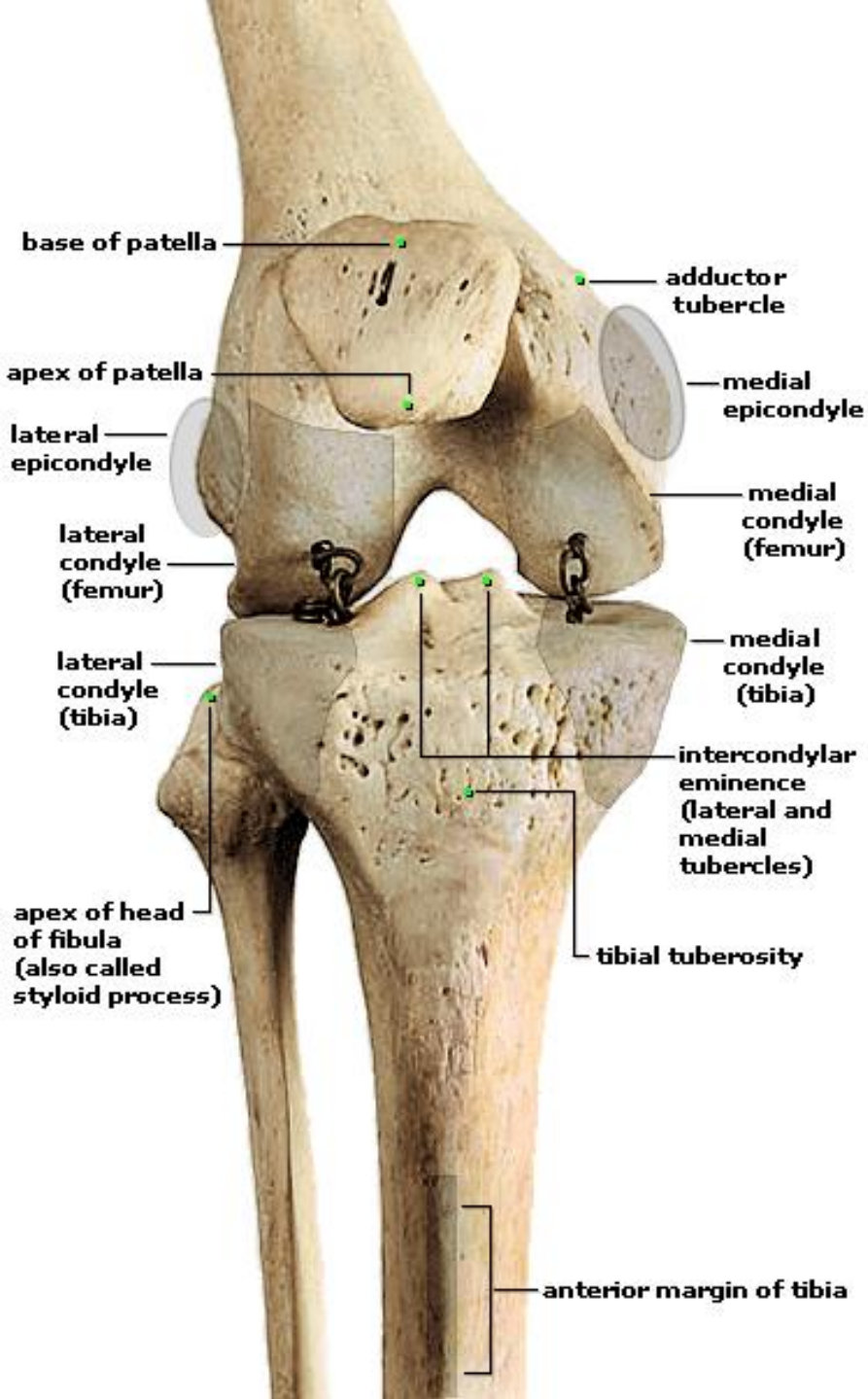
pisiform bone

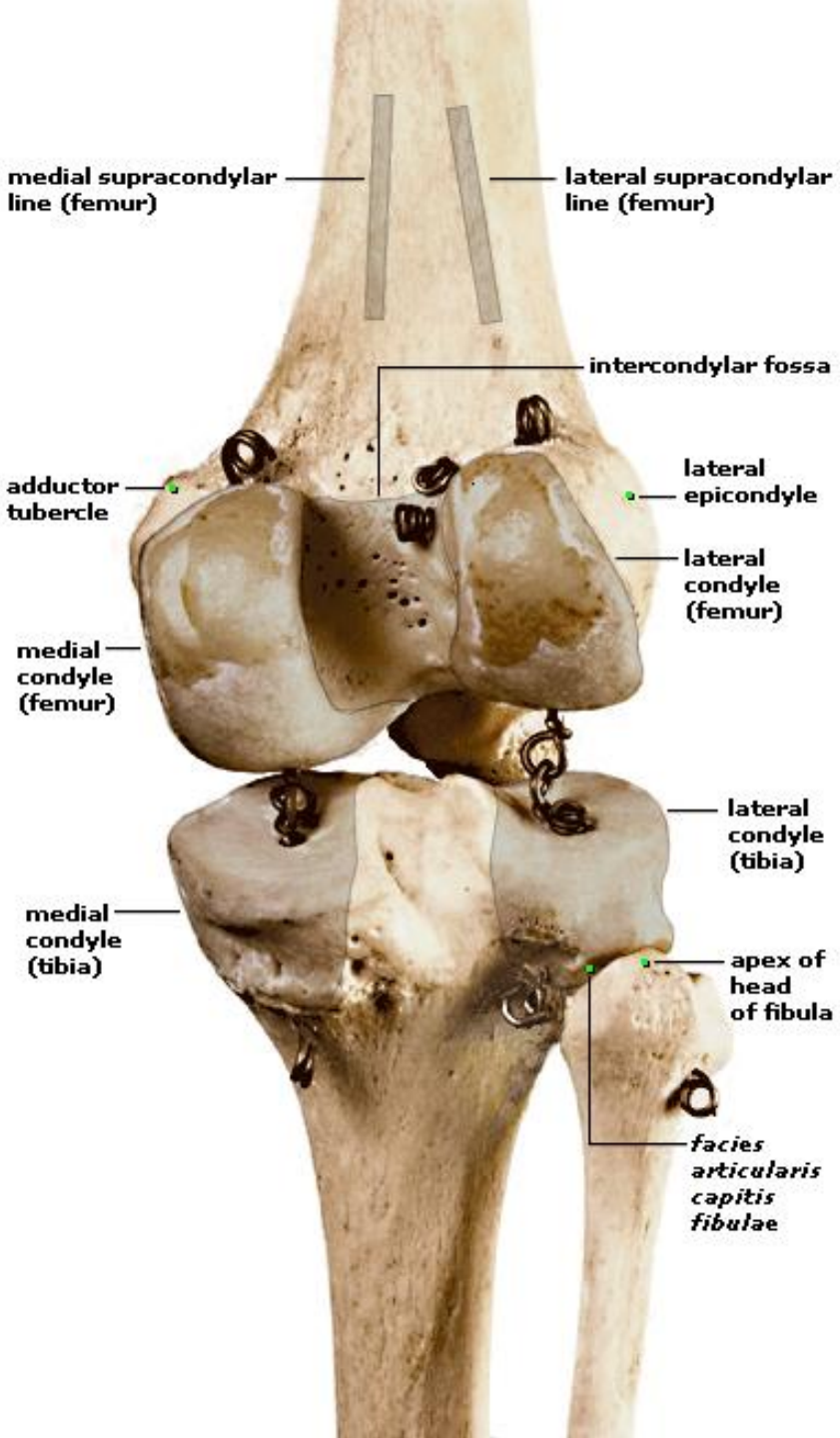
hamulus
of hamate

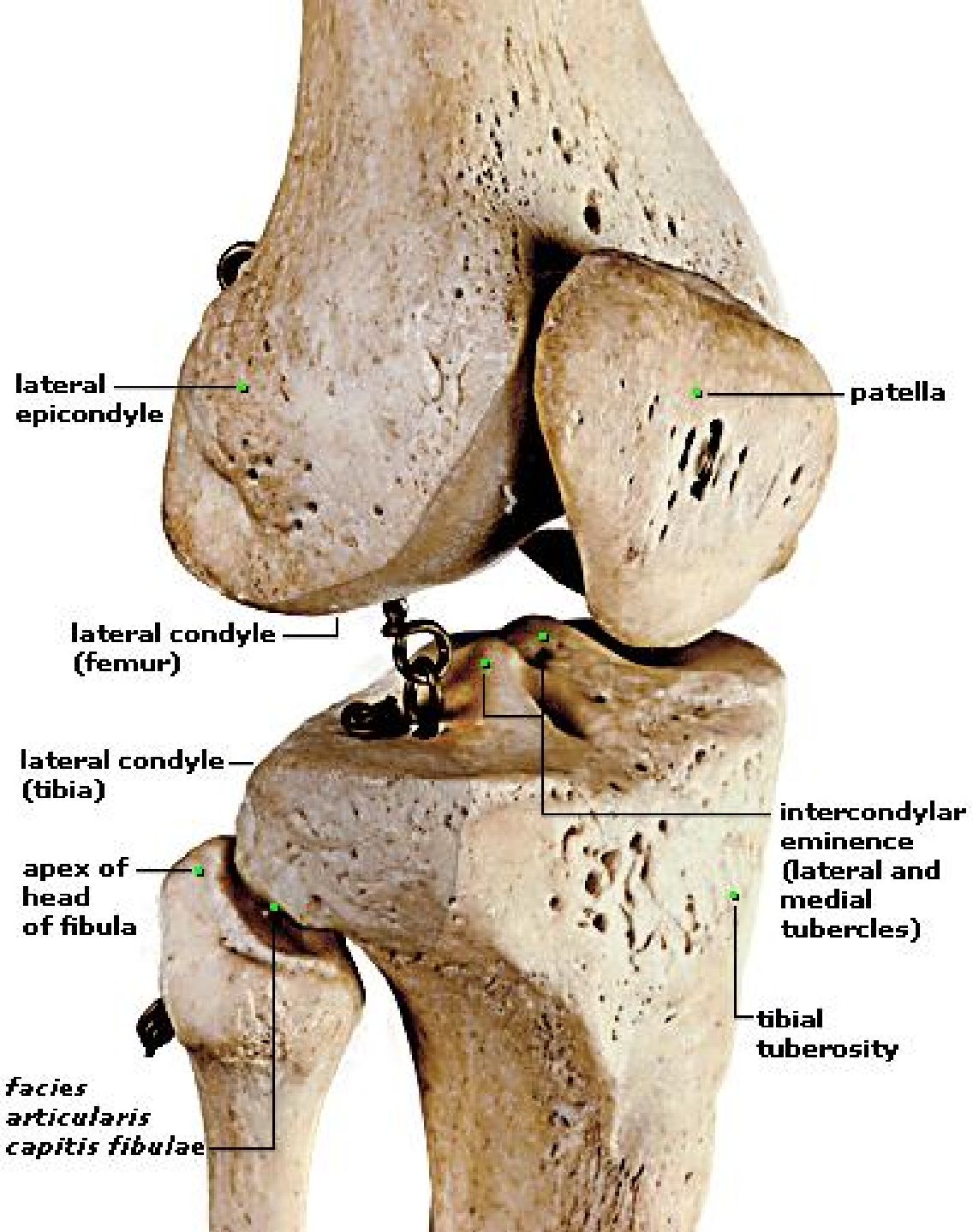
hamulus
of hamate

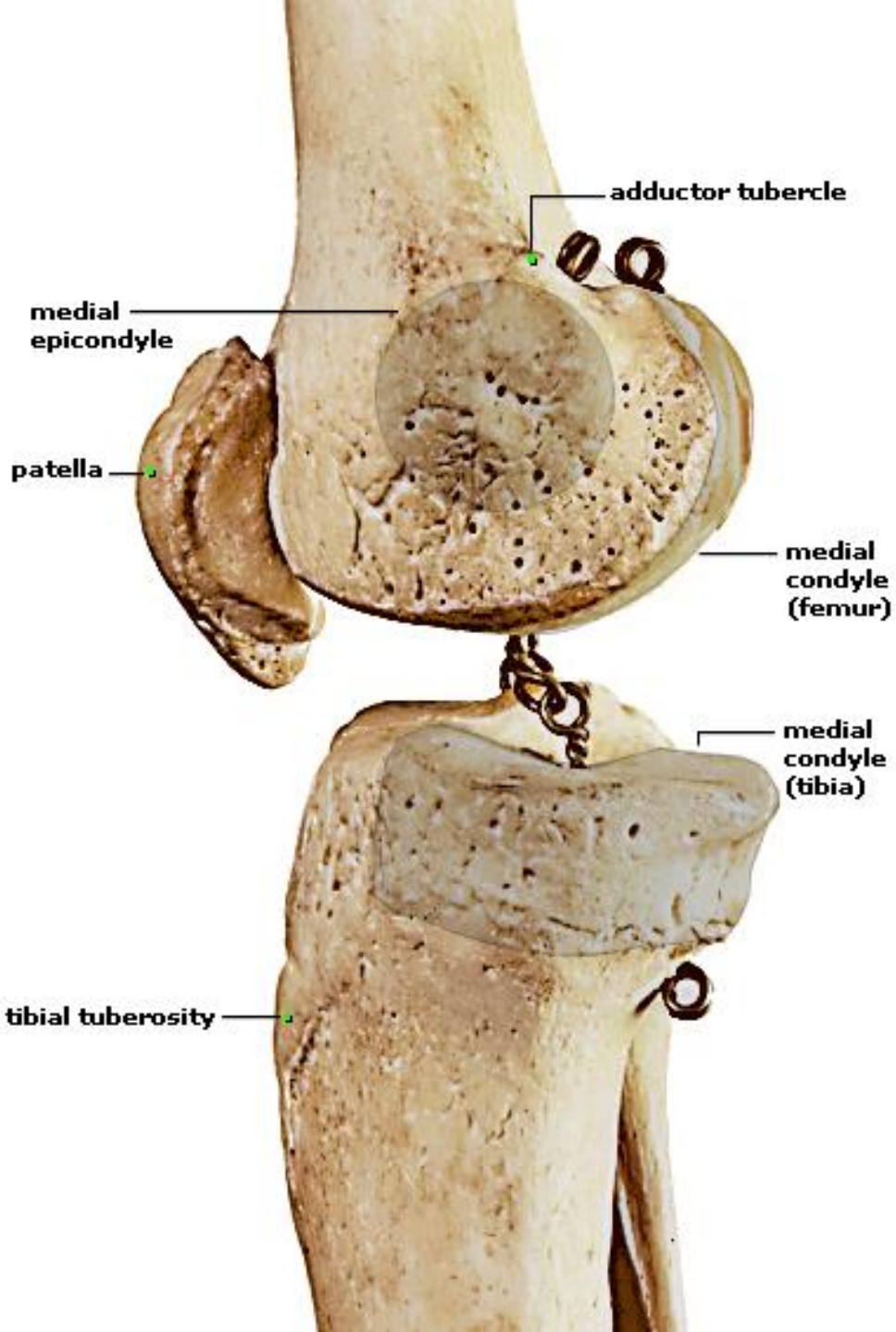
anterior

posterior

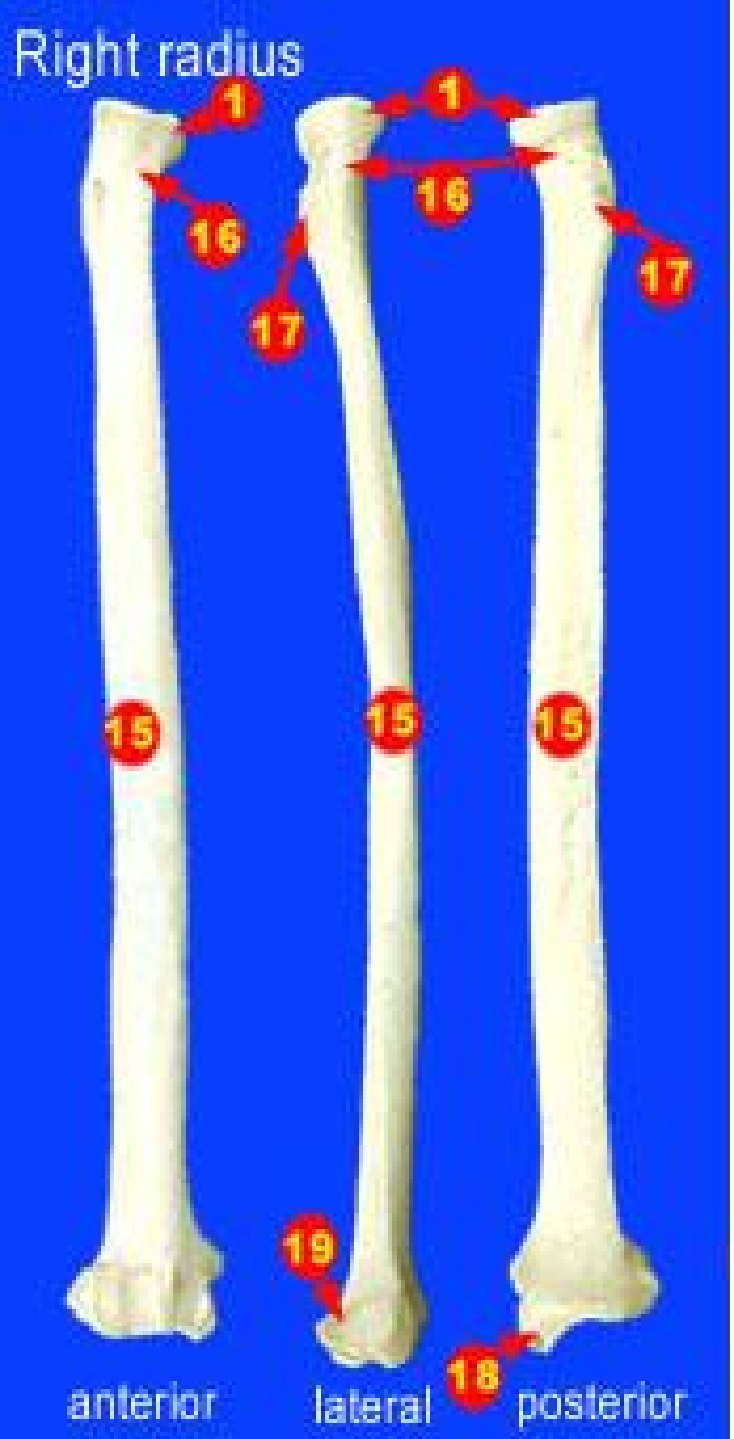

base of patella
adductor tubercle
apex of patella
medial epicondyle
lateral epicondyle
medial condyle (femur)
lateral condyle (femur)
medial condyle (tibia)
lateral condyle (tibia)
intercondylar eminence (lateral and medial tubercles)
apex of head of fibula (also called styloid process)
tibial tuberosity
anterior margin of tibia

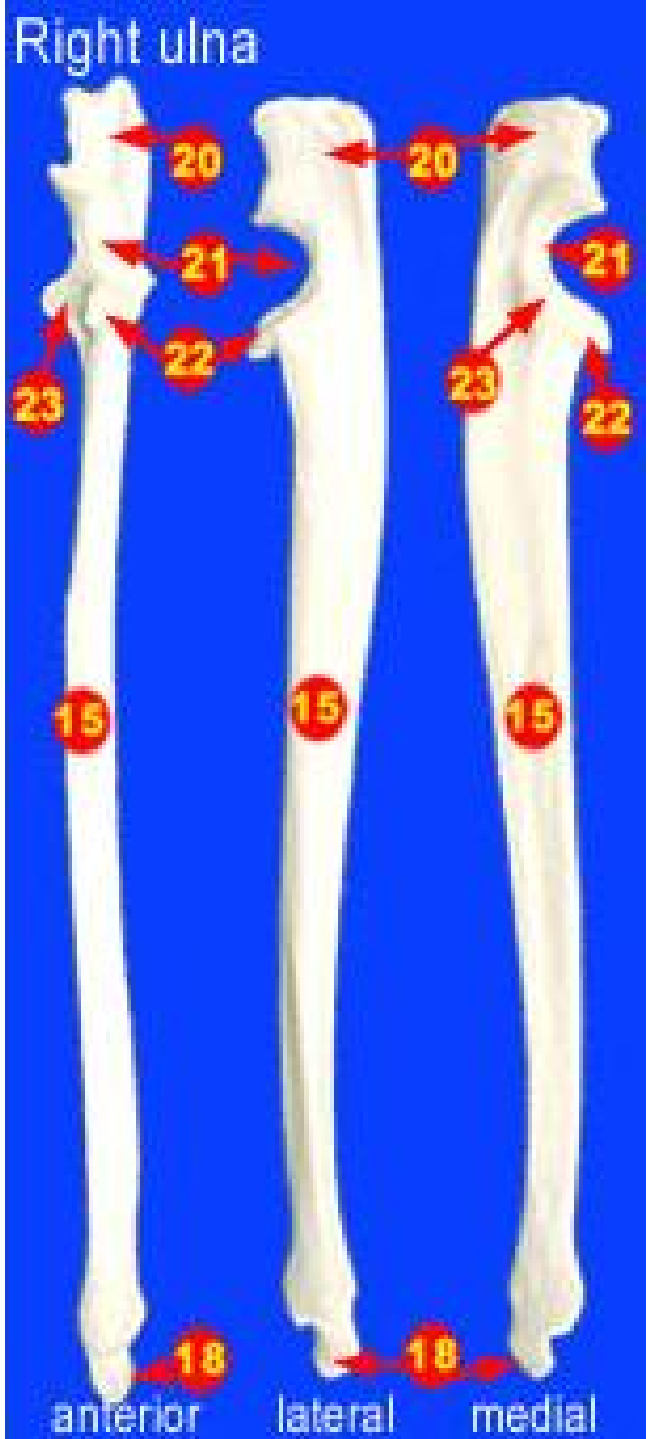

medial supracondylar line (femur)
lateral supracondylar line (femur)
intercondylar fossa
adductor tubercle
lateral epicondyle
lateral condyle (femur)
medial condyle (femur)
lateral condyle (tibia)
medial condyle (tibia)
apex of head of fibula
facies articularis capitis fibulae


lateral epicondyle
patella
lateral condyle (femur)
lateral condyle (tibia)
intercondylar eminence (lateral and medial tubercles)
apex of head of fibula
tibial tuberosity
facies articularis capitis fibulae


adductor tubercle
medial epicondyle
patella
medial condyle (femur)
medial condyle (tibia)
tibial tuberosity

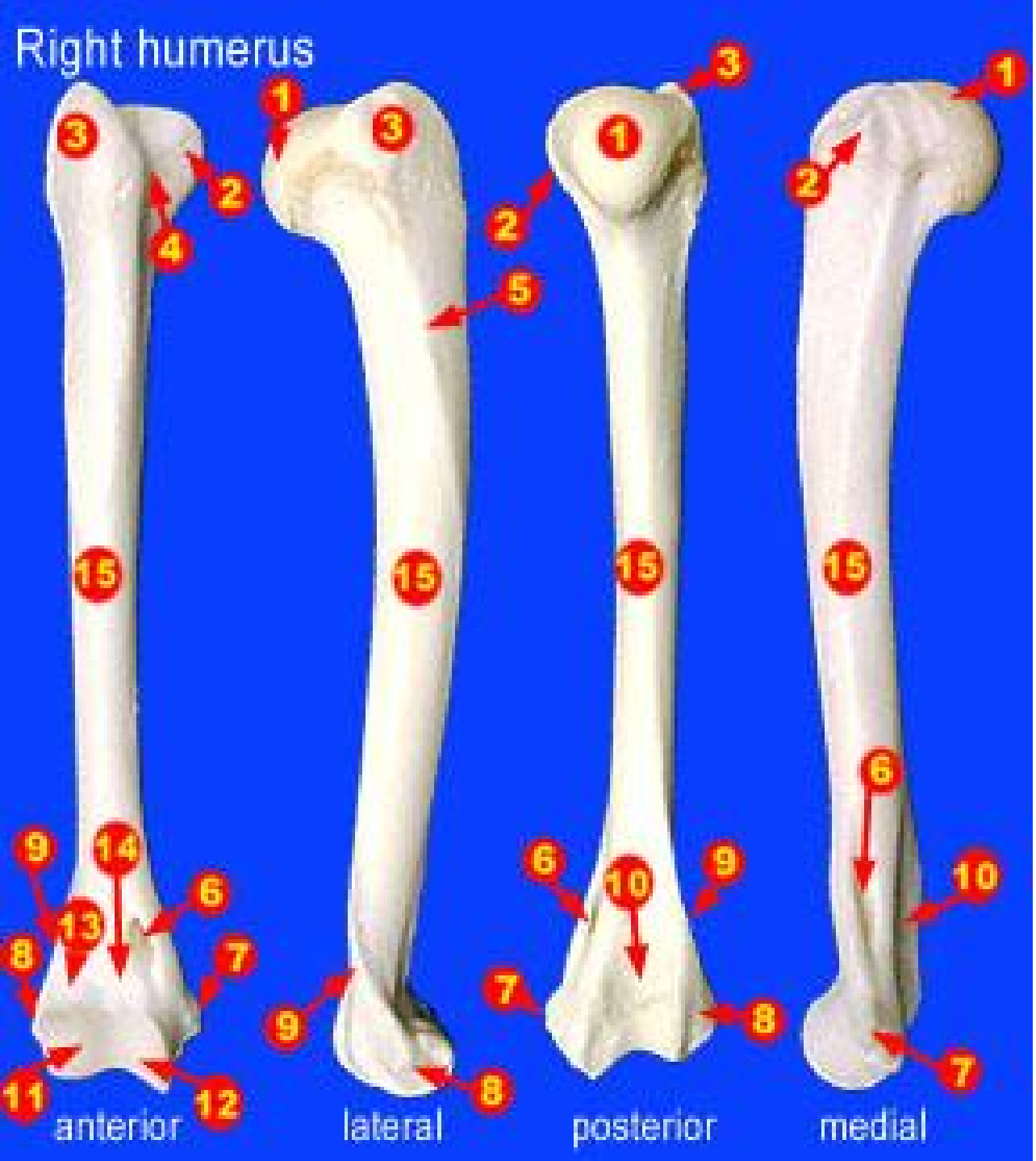
4th PIP joint
5th MCP joint





Cat humerus, radius and ulna

1. head
2. lesser tuberosity
3. greater tuberosity
4. bicipital groove
5. deltoid tuberosity
6. supracondyloid foramen
7. medial epicondyle
8. lateral epicondyle
9. supracondyloid ridge
10. olecranon fossa
11. capitulum
12. trochlea
13. coronoid fossa
14. radial fossa
15. shaft
16. neck
17. bicipital tuberosity
18. styloid process
19. ulnar notch
20. olecranon
21. semilunar notch
22. coronoid process
23. radial notch



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